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BLISTER RUST

CONTROL WORK

in the

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WHITE PINE BLISTER RUST CONTROL

IN THE

NORTHWESTERN REGION

January 1 to December 31, 1945

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WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1945

Herman E. Swanson, Regional Leader

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FOREWORD

Blister rust control work in the Northwestern Region is organized and administered under several work or financial projects. Under Work Project BLR-1-4, the Bureau of Entomology and Plant Quarantine cooperating with other agencies, is responsible for leadership, coordination and technical direction of the program. The Bureau is also responsible for the direct administration, under Work Project BLR-3-4, of blister rust control operations on state and private lands in cooperation with state and private agencies.

Financial Project BLR-4 covers blister rust control operations on National Forest lands and is administered by the United States Forest Service.

Financial Project BLR-5 covers blister rust control operations on National Parks and is administered by the National Park Service of the Department of Interior.

This section of the report summarizes the highlights of the 1945 season and the progress of control in the region as a whole and is followed by reports on the work on state and private lands, National Forest lands, and National Parks. In addition, detailed reports are presented for the several territorial units (operations) and for methods development and control investigations.

FIELD SEASON, 1945

Progress in 1945. During 1945, a total of 51,278 acres were worked including 12,415 acres first working, 17,114 acres second and 21,749 acres third. This represents an increase of 37 percent over 1944 accomplishments. An extremely bad forest fire season and a continued shortage of qualified labor and supervisors prevented the making of substantially greater progress.

Fire Fighting. The bad fire season resulted in considerable loss of time from blister rust control work since the crews were called upon frequently for fire fighting duty. Forest Service crews were the hardest hit with many crews spending as much as 50 percent of their time on fires. Over the blister rust project as a whole it is estimated that 20 to 30 percent of the effective working season was lost because of fire fighting. Since this loss occurred at a time when field conditions are most ideal for ribes eradication and when inexperienced labor had reached the peak of its productivity, the loss is particularly detrimental to the best progress on blister rust

control. The many interruptions caused by fire calls also have an adverse effect on the efficiency of the workers.

Labor. During April, May and June, 2,352 workers were assembled by the agencies administering blister rust projects. This field force represented a full quota as limited by the amount of funds available up to June 3, 1945. As during the previous war years, teen-aged boys, numbering approximately 1,202, constituted the chief source of labor. The field force was augmented by approximately 925 Mexican Nationals and 175 German Internees employed on the Forest Service project and 50 Civilian Public Service workers employed on the National Parks. While the full quota of workers was obtained at the start of the season, the shortage of labor made it impossible to secure more workers later in the season to take care of replacements.

Infection Conditions. No blister rust infection on white pine or ribes was found in 1945 which would extend the known limits of spread in the Northwestern Region. Heavy infection was found on six ribes plants on the Mammoth area in the northwestern portion of Yellowstone National Park. These infected plants were found on Clematis Gulch and Glen Creek and corroborate the original discovery in this territory in 1944 of one infected plant on Clematis Gulch.

The year 1945 did not appear favorable for blister rust spread and intensification. According to past occurrence of heavy infection in cycles of four years, it was anticipated that 1945 would be another year favorable to considerable spread and intensification of the rust. Weather conditions in the spring were ideal for spread from pine to ribes but the heavy initial infection of ribes was largely dissipated by the long period of dry hot weather continuing from late June to late August in most of the Inland Empire unit of the Northwestern Region. The small amount of ribes infection in the telial stage observed during the normal period of greatest rust spread from ribes to pine indicates that only a nominal amount of new pine infection is expected to have occurred in 1945.

Predictions based on similar observations for 1942, 1943 and 1944 have thus far been substantiated as field surveys and investigations have not revealed any considerable amount of pine infection originating in these years. The failure of ideal conditions for spread of the rust to develop into wavelike proportions which characterized 1937 and 1941 has been a mitigating factor for the slow progress of control work which has fallen far behind schedule during the war.

Methods. In cooperation with the Timber Management Division of the Forest Service in Region One, progress is being made in directing timber cutting and stand improvement practices which will simplify the job of ribes eradication on cut-over lands through the natural suppression or elimination of ribes seed and seedlings by shade or fire. Present recommended practice is to predetermine the potential ribes problem represented in stored seed in the different types on a timber sale area. Where stored ribes seed are not present, cutting practices can be followed without consideration of any ribes problem. Where stored ribes seed are present, this hazard can be minimized or eliminated by employment of the natural forces of either shade or fire,

the particular method being governed by site, volume, composition, age and condition of the stand. The shade factor is used under a system of partial cutting, leaving a well-spaced volume to provide from 45 to 60 percent shade. Under this shade, high mortality of ribes seedlings will result and ungerminated ribes seed will become devitalized within 5 to 7 years. This method being in reality the two or three cut plan, has many merits other than its benefit to the blister rust control problem. It will serve to take trees on the first cut which are susceptible to insect attack and are often lost. The growth increment by the time of the second cut on a well-spaced residual stand will greatly increase the yield. In overmature and decadent stands or in other situations where partial cutting is not warranted, clear cutting followed by broadcast burning and planting is often the most practical solution for re-establishing a white pine stand and minimizing the blister rust control problem. Each of these two methods has the effect of eliminating the greater part of the ribes potential by natural forces before a new white pine crop is started.

Broadcast Spraying. The increased accessibility of cut-over lands and the development of chemicals which may be suitable for destroying upland ribes made it advisable to explore the practicability of broadcast power spraying on cut-over areas supporting high ribes populations. From the standpoint of labor costs, which amounted to one-half to three-quarters of a man-day per acre, and the adaptability of power equipment for this purpose, the method has very high merit. The ultimate use of the method depends upon finding a chemical which will do the job at a reasonable cost. Ammonium sulfamate was used in the trial tests of the method. The present price of this chemical appears too high for extensive use and its effectiveness in killing upland ribes as applied in this test cannot be determined until 1946.

SUMMARY OF PROGRESS

In the commercial white pine area of the Inland Empire, the present control area comprises 2,610,900 acres of which 1,758,770 acres representing 67 percent have been initially worked, 412,836 acres have received second working and 93,915 acres third working. The acreage on maintenance amounts to 602,786 acres or 23 percent of the total control area. Substantial additional acreages are on or approaching maintenance but have not been so classified until the necessary surveys and mop-up work have been performed.

As has been previously reported, the major problem of blister rust control in the Inland Empire involves the protection of new white pine stands becoming established following logging of the mature stands. The curtailed program during the war has not been able to keep apace with this accumulation of acreage. Control investigations for development of more economical and practical methods of eliminating ribes on such areas are being explored with some success.

A summary of blister rust control activities in the Northwestern Region for the calendar year 1945 and for all years is presented in the following tables:

TABLE 1

SUMMARY OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES - 1945

State	Operating Agency	First Working			Second Working			Other Workings			All Workings			Per Acre		Number of Camps	Total Seasonal Employees
		Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Ribes	Man-Days		
Idaho	BEPQ	467	102,040	748	3,309	160,165	3,990	7,034	210,877	8,207	10,810	473,082	12,945	44	1.20	8	429
	FS	2,060	2,725,806	4,149	4,485	403,520	7,962	10,774	420,800	19,110	17,319	3,550,126	31,221	205	1.80	22	1,195
	Subtotal	2,527	2,827,846	4,897	7,794	563,685	11,952	17,808	631,677	27,317	28,129	4,023,208	44,166	143	1.57	30	1,624
Montana	FS	3,178	340,552	4,482	1,163	77,947	2,593	671	35,121	1,014	5,012	453,620	8,089	91	1,61	7	341
	NPS	356	16,776	249	1,223	11,672	396	603	13,087	465	2,182	41,535	1,110	19	.51	1	25
	Subtotal	3,534	357,328	4,731	2,386	89,619	2,989	1,274	48,208	1,479	7,194	495,155	9,199	69	1.28	8	366
Washington	FS	4,787	1,308,011	4,738	6,934	392,767	4,950	1,642	41,788	676	13,363	1,742,566	10,364	130	.78	6	307
	NPS							1,025	46,422	1,200	1,025	46,422	1,200	45	1.17	1	30
	Subtotal	4,787	1,308,011	4,738	6,934	392,767	4,950	2,667	88,210	1,876	14,388	1,788,988	11,564	124	.80	7	337
Wyoming	NPS	1,567	95,769	992							1,567	95,769	992	61	.63	1	25
All States	BEPQ	467	102,040	748	3,309	160,165	3,990	7,034	210,877	8,207	10,810	473,082	12,945	44	1.20	8	429
	FS	10,025	4,374,369	13,369	12,582	874,234	15,505	13,087	497,709	20,800	35,694	5,746,312	49,674	161	1.39	35	1,843
	NPS	1,923	112,545	1,241	1,223	11,672	396	1,628	59,509	1,665	4,774	183,726	3,302	38	.69	3	80
Total		12,415	4,588,954	15,358	17,114	1,046,071	19,891	21,749	768,095	30,672	51,278	6,403,120	65,921	125	1.29	46	2,352

TABLE 2

ACREAGE WORKED BY LAND OWNERSHIP - 1945

Land Ownership	First Working Acres	Second Working Acres	Other Workings Acres	All Workings Acres
National Forest Region 1	8,823	11,679	11,593	32,095
National Park	1,923	1,223	1,628	4,774
Public Domain			327	327
State and Private	1,669	4,212	8,201	14,082
Total	12,415	17,114	21,749	51,278

TABLE 3

SUMMARY OF EXPENDITURES - FEDERAL AND COOPERATIVE - 1945

State	Cooperative Funds		Total Federal Funds	Total All Funds	Federal Funds				Cooperative Funds Direct Aid			Expenditures Ribes Eradication
	Total (Direct and Indirect Aid)	Direct Aid			Entomology and Plant Quarantine 3101	Entomology and Plant Quarantine 3103	Forest Service	Park Service	State	Private	Total	
Idaho	$12,398.71	$11,398.71	$ 738,059.29	$ 750,458.00	$72,613.84	$103,148.43	$562,297.02		$6,287.68	$5,111.03	$11,398.71	$561,722.16
Montana	1,000.00		167,325.14	168,325.14	10,176.34		156,204.48	$ 944.32				123,026.80
Washington	1,000.00		210,879.26	211,879.26	10,184.84		187,098.77	13,595.65				156,974.42
Wyoming	200.00		8,390.28	8,590.28	2,671.35			5,718.93				5,718.93
Total	$14,598.71	$11,398.71	$1,124,653.97	$1,139,252.68	$95,646.37	$103,148.43	$905,600.27	$20,258.90	$6,287.68	$5,111.03	$11,398.71	$847,442.31

TABLE A

STATUS OF RIBES ERADICATION BY STATES - ALL OWNERSHIPS, DECEMBER 31, 1945
Accumulative Series - Net

State	Total Acres		First Working		Second Working	Other Workings	On Maintenance		Remaining Work	
	White Pine	Control Area (Wh.P.& Prot.Zone)	Acres	Percent	Acres	Acres	Acres	Percent	Unworked Acres	Requiring Rework Acres
Idaho	2,253,464	2,253,464	1,517,283	67	365,721	78,488	489,176	22	736,181	1,028,107
Montana	212,781	212,781	135,897	64	14,223	5,152	76,372	36	76,884	59,525
Washington	152,964	152,964	112,724	74	38,634	17,433	42,888	28	40,240	69,836
Subtotal	2,619,209	2,619,209	1,765,904	67	418,578	101,073	608,436	23	853,305	1,157,468
Wyoming	*240,167	*240,167	23,327	10			9,950	4	216,840	13,377
Colorado	*206,000	*206,000	14,859	7	1,962		8,000	4	191,141	6,859
Subtotal	446,167	446,167	38,186	9	1,962		17,950	4	407,981	20,236
Total	3,065,376	3,065,376	1,804,090	59	420,540	101,073	626,386	20	1,261,286	1,177,704

*Indefinite

TABLE B

SUMMARY OF STATUS OF RIBES ERADICATION BY LAND OWNERSHIP, DECEMBER 31, 1945
Accumulative Series - Net

Land Ownership	Total Acres		First Working		Second Working	Other Workings	On Maintenance		Remaining Work	
	White Pine	Control Area (Wh.P.& Prot.Zone)	Acres	Percent	Acres	Acres	Acres	Percent	Unworked Acres	Requiring Rework Acres
National Forests R-1	1,401,414	1,401,414	1,047,027	75	243,991	48,835	365,328	25	354,387	691,699
National Forests R-2 & 4	*421,000	*421,000	36,619	9	1,962		17,000	4	384,381	19,619
Subtotal	1,822,414	1,822,414	1,083,646	59	246,953	48,835	372,328	20	738,768	711,318
National Parks	22,476	22,476	8,701	39	5,742	7,168	6,600	29	13,775	2,101
Indian Lands	*11,000	*11,000							11,000	
Public Domain	29,409	29,409	16,717	57	5,900	1,366	5,609	19	12,692	11,208
Subtotal--Interior	62,885	62,885	25,418	40	11,642	8,534	12,109	19	37,467	13,309
Total--Federal	1,885,299	1,885,299	1,109,064	69	257,695	57,359	384,437	20	776,235	724,627
State & Private Lands	1,180,077	1,180,077	695,026	59	162,945	43,714	241,949	21	485,051	453,077
Total	3,065,376	3,065,376	1,804,090	59	420,540	101,073	626,386	20	1,261,286	1,177,704

*Indefinite

TABLE C

SUMMARY OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES 1923-1946
Accumulative Series - Gross

State	Operating Agency	First Working			Second Working			Other Workings			All Workings			Per Acre	
		Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Ribes	Man-Days
Idaho	BEPQ	780,515	130,051,154	518,645	147,890	21,369,018	140,531	30,172	2,639,686	34,923	958,577	154,059,857	694,099	161	.72
	Forest Service	886,983	200,777,628	843,685	221,178	26,809,237	254,976	48,923	3,704,642	75,647	1,157,084	231,291,507	1,174,308	200	1.01
	Subtotal	1,667,498	330,828,782	1,362,330	369,068	48,178,265	395,507	79,095	6,344,327	110,570	2,115,661	385,351,364	1,868,407	182	.88
Montana	BEPQ	55,469	6,913,038	30,728	1,961	565,047	2,577	648	69,040	777	58,078	6,537,125	34,082	96	.50
	Forest Service	70,875	11,430,405	66,930	10,288	1,067,409	15,937	3,857	217,274	4,362	85,020	12,715,088	87,229	150	1.03
	Park Service	3,553	481,331	4,154	2,202	179,622	1,447	647	36,805	581	6,402	697,758	6,182	109	.97
	Subtotal	139,897	17,824,774	101,812	14,451	1,812,078	19,961	5,152	313,119	5,720	159,500	19,949,971	127,493	126	.80
Washington	BEPQ	48,156	14,422,701	46,892	11,920	2,634,166	12,213	4,681	768,915	4,036	64,757	17,825,782	63,140	276	.98
	Forest Service	74,146	14,206,490	54,225	25,341	2,610,574	19,220	6,241	345,912	4,472	106,728	17,062,976	77,917	161	.74
	Park Service	8,254	1,640,507	10,070	4,327	400,913	5,941	6,731	201,199	6,040	19,312	2,242,619	22,051	116	1.14
	Subtotal	130,556	30,269,698	111,187	41,588	5,545,653	37,373	17,653	1,316,026	14,548	189,797	37,131,377	163,108	196	.86
Wyoming	BEPQ	21,760	1,085,771	6,940							21,760	1,085,771	6,940	50	.32
	Park Service	1,567	95,769	992							1,567	95,769	992	61	.63
	Subtotal	23,327	1,181,540	7,932							23,327	1,181,540	7,932	51	.34
Colorado	BEPQ	14,859	410,649	6,292	1,962	86,886	664				16,821	497,535	6,956	30	.41
All States	BEPQ	930,759	151,883,313	609,497	163,733	24,655,117	155,984	35,501	3,467,640	39,736	1,129,993	180,006,070	805,217	169	.71
	Forest Service	1,032,004	226,414,623	964,840	256,807	30,387,220	290,133	59,021	4,267,828	84,481	1,347,832	261,069,571	1,339,454	194	.99
	Park Service	13,374	2,217,607	15,216	6,529	580,535	7,388	7,378	238,004	6,621	27,281	3,036,146	29,225	111	1.07
Total		1,976,137	380,515,443	1,589,553	427,069	55,622,872	453,505	101,900	7,973,472	130,838	2,505,106	444,111,787	2,173,896	177	.87

Cooperative Blister Rust Control on State and Private Lands in 1945
(Work Project BLR-3-4)

Cooperative blister rust control on state and private lands in 1945 was confined to the State of Idaho. Work under this project was performed on the lands in the Clearwater, Potlatch and Priest Lake Timber Protective Associations and was administered by the Bureau of Entomology and Plant Quarantine.

The field project included 8 camps with a total of 429 workers, who for the most part were boys, 16 and 17 years old. The camps and workers were distributed as follows: Clearwater 3 camps, 130 workers; Potlatch 3 camps, 185 workers; Priest Lake 2 camps, 114 workers.

The progress of blister rust control on state and private lands has fallen considerably behind schedule during the war. The supply of labor and funds during this period has been inadequate to keep apace with the urgent needs. The amount of cut-over area requiring ribes eradication is rapidly increasing and the protection of the new crop of white pine on these areas is the major problem facing the control program.

Increased federal allotments for the fiscal year 1946 made possible a slight increase in the control program during 1945. Since these funds were not available until July 1, 1945, it was not possible to secure much additional labor after that time. With the war over, it is anticipated that labor will be available in larger numbers in the spring of 1946 and adequate funds are available to increase the size of the project considerably during the 1946 season.

At the present time 241,949 acres representing 35 percent of the worked area in state and private ownership are classed on maintenance. Considerable additional area is on or approaching a complete protection basis but awaits final checking and whatever mop-up work is required. Although the acreage in state and private ownership on which ribes eradication has been performed during the war period is only 56,600 acres, the majority of this acreage represents highly productive land on which the present stocking of white pine should yield very high volumes at maturity.

The results of the 1945 program and the net progress on state and private lands are summarized in the following tabulations:

1. Allotments

	Fiscal Year 1945	Fiscal Year 1946
Federal (BLR-3-4)	$64,870.00	$210,000.00
State of Idaho	15,000.00	15,000.00
Clearwater T.P.A.	6,413.72	6,416.58
Potlatch T.P.A.	5,174.28	5,174.28
Priest Lake T.P.A.	4,235.26	4,260.44
Total	$95,693.26	$240,851.30

2. Expenditures - Calendar Year 1945

Association	State and Private	Federal (BLR-3-4)	Total
Clearwater	$ 4,659.99	$ 34,482.34	$ 39,142.33
Potlatch	1,238.72	41,556.85	42,795.57
Priest Lake	5,500.00	27,109.24	32,609.24
Total	$11,398.71*	$103,148.43	$114,547.14

*State $6,287.68; Private $5,111.03

Cash expenditures from cooperative funds deposited with U. S. Treasurer, 1928-1945; State $193,499.32, Private $140,691.50, Total $334,190.82.

3. Cooperative Ribes Eradication in Idaho, 1945

	Acres Worked				Ribes	Per Acre	
Association	Initial	Rework	Total	Man-Days	Destroyed	Man-Days	Ribes
Clearwater	352	2,588	2,940	4,522	247,961	1.54	84
Potlatch	43	3,901	3,944	4,953	71,428	1.26	18
Priest Lake	72	3,854	3,926	3,470	153,693	.88	39
Total	467	10,343	10,810	12,945	473,082	1.20	44

4. State and Private Lands Worked in 1945

	Acres Worked			
State	First	Second	Third	Total
Idaho	611	3,821	7,986	12,418
Montana	1,058	74	215	1,347
Washington		317		317
Total	1,669	4,212	8,201	14,082

5. Progress on State and Private Lands, 1923-1945 (Net Acres)

	Acres Worked			Acres	Total Acres
State	First	Second	Third	Unworked	in Control Area
Idaho	651,858	149,391	37,267	464,437	1,116,295
Montana	20,075	2,255	1,766	15,287	35,362
Washington	23,093	11,299	4,681	5,327	28,420
Total	695,026	162,945	43,714	485,051	1,180,077

Blister Rust Control on National Forests in 1945
(Financial Project BLR-4)

Blister rust control work in 1945 was conducted by the Forest Service in Region One on six national forests. Available labor and supervisors were again important factors in building up the project to desired strength. The Forest Service met the labor problem by entering into an agreement with the War Food Administration for the assignment of Mexican Nationals. These were available for the approximate periods of April 4 to May 25 and July 15 to September 25. The total man power of the Forest Service blister rust control program was about 1,843 workers, composed of approximately the following: 743 boys, 925 Mexican Nationals and 175 German Internees.

The number of camps and workers on each forest were as follows:

National Forest	Number of Camps	Number of Workers
Clearwater	5	330
St. Joe	8	415
Coeur d'Alene	7	390
Kaniksu	8	367
Cabinet	2	180
Kootenai	5	161
Total	35	1,843

A late spring, with inclement weather, and a heavy drag on blister rust crews for fire duty, resulted in a serious loss of time from ribes eradication work. The late spring prevented the full utilization of some 900 Mexican Nationals who were secured for the project in April and May. During this period, when it was not possible to perform ribes eradication because of snow conditions and late leafing out of ribes to permit identification, crews were employed on pruning work in heavily infected white pine stands. The removal of cankered limbs in these stands will serve to prevent serious loss of white pine trees. A total of 285,722 trees were treated.

Blister rust crews were used considerably for fighting forest fires on National Forests during July and August. This loss of time was costly to the blister rust project and greatly handicapped progress. The losses were so pronounced that the Forest Service is making an analysis of the effect of fire duty on the blister rust program.

Extension was made in the employment of cutting and silvicultural practices on timber sale areas which will minimize the job of ribes eradication following logging. Several areas were inspected and surveyed to determine the factor of stored ribes seed and to establish a cutting plan to take care of this potential ribes problem.

To meet the increasing complexity of the blister rust control problem and to secure full integration and coordination of the program with the over-all plans in timber management, the Forest Service placed Mr. G. M. DeJarnette

in charge of their blister rust control program in Region One. This assignment greatly strengthened the administration of the program.

The following tabulations summarize the expenditures and progress of work on National Forest lands:

1. Expenditures - Calendar Year 1945

Clearwater	$115,767.36
St. Joe	195,941.51
Coeur d'Alene	200,854.15
Kaniksu	236,832.77
Cabinet	91,551.98
Kootenai	64,652.50
Total	$905,600.27

2. Expenditures - 1930-1945

	Regular	Emergency	Total
Clearwater	$ 936,252.93	$ 413,454.80	$1,349,707.73
St. Joe	1,842,995.06	383,340.06	2,226,335.12
Coeur d'Alene	960,700.34	669,809.81	1,630,510.15
Kaniksu	901,126.05	458,055.36	1,359,181.41
Cabinet	354,723.26	258,476.52	613,199.78
Kootenai	130,223.64	28,233.00	158,461.64
Total	$5,126,026.28	$2,211,369.55	$7,337,395.83

3. Ribes Eradication by Forest Service Crews, 1945

	Acres Worked				Ribes	Per Acre	
Forest	Initial	Rework	Total	Man-Days	Destroyed	Man-Days	Ribes
Clearwater	320	3,611	3,931	7,892	2,319,658	2.01	717
St. Joe	28	5,452	5,480	10,843	170,926	1.98	31
Coeur d'Alene	1,208	3,894	5,102	9,741	381,558	1.91	75
Kaniksu	5,291	10,878	16,169	13,109	1,920,750	.81	119
Cabinet	583	841	1,424	3,750	211,600	2.63	149
Kootenai	2,595	993	3,588	4,339	242,020	1.21	67
Total	10,025	25,669	35,694	49,674	5,746,512	1.39	161

4. Ribes Eradication on National Forest Lands in Region One, 1923-1945

Forest	Net Acres Worked First	Second	Third	Acres Unworked	Total Acres
Clearwater	150,526	49,795	6,773	49,826	200,352
St. Joe	215,404	76,979	19,961	96,804	312,208
Coeur d'Alene*	306,571	47,764	10,486	53,275	359,846
Kaniksu	262,297	59,687	8,876	94,060	356,357
Cabinet	61,995	7,779	2,584	11,599	73,594
Kootenai	50,234	1,987	155	48,823	99,057
Total	1,047,027	243,991	48,835	354,387	1,401,414

*Includes National Forest land on Mount Spokane Operation.

Blister Rust Control on National Parks in 1945
(Financial Project BLR-5)

Blister rust control work in 1945 was conducted by the National Park Service on Mount Rainier, Glacier and Yellowstone National Parks. Although fire duty interrupted the orderly progress of control work in all Parks and a late spring handicapped early season work in Mount Rainier, the 1945 field season was one of the most satisfactory since the start of the war. Most of the work planned for 1945 was completed. Work on late season fires prevented crews from completing some work in the protection zones and mopping up in areas which supported high ribes populations. This work can be handled in future seasons.

Control work has progressed sufficiently on Mount Rainier and Glacier to permit a detailed projected future plan of control needs. A plan was presented for Mount Rainier in 1944 and a similar plan was prepared and presented in the 1945 report on Glacier.

Ribes eradication work was started in Yellowstone in 1945 on the Mammoth area. After field examinations by members of the National Park Service and the Bureau of Entomology and Plant Quarantine, a decision was reached to include only the Mammoth, Mt. Washburn and Craig Pass units in the control area for Yellowstone National Park. Work plans have been made to start work on the Mt. Washburn area in 1946. Additional surveys are necessary for Craig Pass to determine the extent of the work necessary. Preliminary extensive surveys indicated that a large percentage of the area is free of ribes.

A review was made of the problem of blister rust control in Grand Teton and a recommendation was made against attempting protection of the white pine from blister rust. This recommendation was prompted by experience gained in the protection of Pinus albicaulis, the pine species involved in Grand Teton. In advising against blister rust control, the following conditions in the Park appeared to render the establishment of protection impractical if not impossible: (1) high susceptibility of P. albicaulis, (2) general distribution of Ribes petiolare, a highly susceptible ribes known to infect P. albicaulis over considerable distances, (3) rough topography involving hazardous and costly ribes eradication, (4) occurrence of ribes in open upland sites favorable to wide dissemination of sporidia from ribes to pine, and (5) meteorological conditions, characteristic of high elevations, including mists and strong winds, favorable for formation of sporidia and their rapid transport over long distances. Under this combination of conditions, it would be only conjecture as to what would constitute an adequate protection strip. The extension of control areas to include adequate protection zones would take in so much rugged country as to make control costs prohibitive.

No blister rust infection was found which would extend the known limits of blister rust in National Parks in this region. No infection was found in Grand Teton. The finding of six infected ribes plants in Clematis Gulch and Glen Creek of the Mammoth area in Yellowstone corroborates the finding

of blister rust for the first time in this area in 1944. The amount of infection found in 1945 indicates the probable presence of pine infection in the general vicinity.

Detailed reports have been prepared on the progress of blister rust control work in Mount Rainier, Glacier and Yellowstone. The following tabulations represent a brief summary of the work:

1. Allotments and Expenditures by National Park Service

National Park	Expenditures: Calendar Year 1945	Expenditures: All Years
Mount Rainier	$13,595.65	$79,531.55
Glacier	944.32	11,149.56
Yellowstone	5,718.93	5,718.93
Total	$20,258.90	$96,400.04

2. Ribes Eradication on National Parks, 1945

National Park	Acres Worked: First	Acres Worked: Second	Acres Worked: Third and Other	Acres Worked: Total	Man-Days	Ribes Destroyed	Per Acre: Man-Days	Per Acre: Ribes
Mount Rainier			1,025	1,025	1,200	46,422	1.17	45
Glacier	356	1,223	603	2,182	1,110	41,535	.51	19
Yellowstone	1,567			1,567	992	95,769	.63	61
Total	1,923	1,223	1,628	4,774	3,302	183,726	.69	38

3. Gross Acreage Worked on National Parks, 1930 - 1944

National Park	Acres Worked: First	Acres Worked: Second	Acres Worked: Third and Other	Acres Worked: Total	Man-Days	Ribes Destroyed	Per Acre: Man-Days	Per Acre: Ribes
Mount Rainier	8,254	4,327	6,731	19,312	22,051	2,242,619	1.14	116
Glacier	3,553	2,202	647	6,402	6,182	697,758	.97	109
Yellowstone	1,567			1,567	992	95,769	.63	61
Total	13,374	6,529	7,378	27,281	29,225	3,036,146	1.07	111

4. Work Status in Net Control Area

National Park	Acres Worked First	Acres Worked Second	Acres Worked Third and Other	Acres Unworked	Total Acres Control Area
Mount Rainier	3,581	3,540	6,511		3,581
Glacier	3,553	2,202	647	1,175	4,728
Yellowstone	1,567			5,600	7,167
Rocky Mountain				7,000	7,000*
Total	8,701	5,742	7,158	13,775	22,476

*Preliminary estimate

BLISTER RUST CONTROL, INLAND EMPIRE, 1945

By

Frank O. Walters

Assistant Regional Leader

The most valuable and extensive white pine timber stands remaining in the United States occur in the Inland Empire section of the Northwestern Region, which comprises northern Idaho, northeastern Washington and western Montana. This section is divided into six operations as follows:

1. Clearwater Operation
2. St. Joe Operation
3. Coeur d'Alene Operation
4. Kaniksu Operation
5. Montana Operation (Cabinet and Kootenai Forests)
6. Mount Spokane Operation (no work since 1941)

Labor Situation. The labor situation continued to constitute a major problem. It was necessary to carry on an intensive recruitment program in the high schools to secure sufficient workers to fill the Bureau camps. The Forest Service used teen-age boys, Mexican Nationals and German Internees. Because of a better understanding of how to supervise and deal with the younger workers, better results were obtained from this group during the current season than in previous seasons. The German Internees were quite satisfactory but were only available until mid-August. Had the Mexicans who were given ribes eradication training in the spring been available again in July, more satisfactory work might have been accomplished. The better workers were retained by the farmers leaving the less capable for blister rust work. Lack of adequate overhead, the language barrier and the inability to adjust themselves to changing working conditions were other factors contributing to the difficulties in securing satisfactory work from Mexican labor.

Accomplishments. The following table shows the accomplishments by classes of labor:

Labor	Number Workers	Ribes Eradication			Canker Elimination	
		Acres	Man-Days	Ribes	Trees Treated	Man-Days
Student	1,075	26,489	33,750	1,800,447	600	10
Mexican National	925	12,065	23,388	3,542,749	285,122	3,265
German Internees	173	7,950	5,481	876,198		
Total	2,173	46,504	62,619	6,219,394	285,722	3,275

Capable and sufficient men to adequately supervise the camps were not available. It was again necessary to train inexperienced men as foremen and camp superintendents.

A bad fire season developed. Nearly one-third of the available work days were spent on fire suppression. Other repercussions of this prolonged seige

of fire duty were a letdown in the efficiency of the workers and a loss of personnel resulting from the dislike of fire fighting assignments. With larger crews in the field there was an increase in accomplishments, 46,504 acres being covered this year compared with 36,624 last year.

Status of work. The severe curtailment of the program during the past several years has caused a serious disruption in the scheduled reworkings on the various operations.

It had originally been expected that it would be possible to rework areas when necessary at properly spaced intervals of from 3 to 5 years. In spite of the urgency of such a follow-up program it has been impossible to execute these successive workings at the proper time on most areas. Hence, only the most critical areas have received second and third eradications. It had been anticipated that losses due to the rust would result where re-eradications were long delayed. This expectation has frequently been borne out. To offset this discouraging aspect two natural factors have tended to alleviate the losses: (1) In some cases the natural regeneration of pine has more than offset the loss from rust. (2) The rapid growth of the young trees has reduced the frequency of fatal infections because of limb length and natural pruning and has helped to shade out regenerating ribes.

Current Year's work. A large portion of this year's work was confined to second and third eradications in plantations and younger age classes of reproduction on burns and logged-over areas.

The Kaniksu and Coeur d'Alene worked largely on plantations and in reproduction areas. Both of these forests have outstanding plantations that are making excellent growths.

A considerable portion of the work on the Clearwater was on cut-over lands. Much of this cut-over is reproducing splendidly to pine. Ribes and white pine regenerating simultaneously shortly after logging usually allow severe rust conditions to become established on these areas before it is possible to initiate eradication measures. At least three thorough workings are usually necessary before control is effected. Even though the first crop of pine may be lost, abundant healthy pine eventually becomes established where there is an adjacent seed source.

On the St. Joe all crews worked in areas of reproduction which became established following burns. On most of these areas control measures were instituted after the disease had become established. While losses due to blister rust have occurred, the stands are open and pine has continued to come in. On many areas some of the older trees are now seeding, thus assuring a continuous seed source.

The Cabinet Forest was concerned primarily with the protection of the Haugan Nursery and adjacent plantations and reproduction areas.

The Kootenai Forest carried on some work in pole stands. A number of excellent stands of pole occur on this forest which will be of vital importance to the lumber economy of the region as the mature stands are removed.

Surveys. All operations carried on comprehensive checking surveys. Practically all worked areas received a check. Most areas not meeting the required standards were reworked.

Checkers capable of adequately performing all phases of the work were difficult to find. By exercising close supervision and working with the checkers, the checking supervisors were able to obtain satisfactory results. Test strips run on four operations showed the checking surveys of the various operations to be on a comparable basis. Only one checker was found to be inadequate in his ability to search out and find ribes.

Lack of individuals capable of carrying on disease survey work has prevented an adequate coverage of the areas on which information is needed. All operations were able to at least make extensive inspections of part of their critical areas.

Operations which have not completed their area classifications gave emphasis to this important phase of the work. Other operations made refinements of some of the more extensively inspected parts of the control area.

Needs. The situation in the younger age classes remains critical. An adequate program allowing properly timed re-eradications over a period of several years is needed to place these stands in a safe condition. Most of the older reproduction and pole stands need only partial workings in the stream type and openings to place them on a maintenance status.

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS IN INLAND EMPIRE, 1945

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 50,054.99
	Regular BLR-3-4	103,148.43
	Subtotal	$ 153,203.42
State of Idaho Timber Protective Associations	State BLR-3-4	$ 6,287.68
	Private BLR-3-4	5,111.03
	Subtotal	$ 11,398.71
Forest Service	Regular BLR-4	$ 907,600.27
Total		$1,072,202.40

TABLE 2

CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1945

Item	Bureau of Entomology and Plant Quarantine				Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	Total
Sal. perm. men	$31,801.39			$ 31,801.39	$ 28,101.77	$ 59,903.16
Sal. temp. men	3,113.55	$ 24,993.93	$ 1,796.99	29,904.47	52,431.98	82,336.45
Wages, temp.labs.	8,730.23	61,401.85	9,258.21	79,390.29	589,132.93	668,523.22
Subs. sup.	1,562.79	12,511.34	343.01	14,417.14	157,372.65	171,789.79
Equipment	424.46	1,157.50		1,581.96	42,917.24	44,499.20
Travel & trans.	2,449.42	1,166.00		3,615.42	14,362.78	17,978.20
Other sup.	1,973.15	1,917.81	.50	3,891.46	23,280.92	27,172.38
Total	$50,054.99	$103,148.43	$11,398.71	$164,602.13	$907,600.27	$1,072,202.40

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
First	Plantation	1945-49	989	545	16,607	.55	17
	Cutover	1940-44	2,611	4,196	2,899,122	1.61	1,110
	Plantation	1940-44	205	260	34,187	1.27	167
	Cutover	1920-39	2,668	1,878	155,998	.70	58
	Reproduction	1910-39	1,755	3,539	776,777	2.02	443
	Pole		1,350	549	48,058	.41	36
	Mature		286	5		.02	
	Miscellaneous		240	778	261,833	3.24	1,091
	Stream (1)		388	2,367	283,827	6.10	732
	Total		10,492	14,117	4,476,409	1.35	427
Second	Cutover	1940-44	352	199	7,107	.57	20
	Plantation	1940-44	2,858	2,142	74,139	.75	26
	Cutover	1920-39	1,797	1,995	115,197	1.11	64
	Reproduction	1910-39	7,573	10,815	649,607	1.43	86
	Pole		1,340	1,113	76,036	.83	57
	Mature		757	909	26,107	1.20	34
	Miscellaneous		203	203	4,587	1.00	23
	Stream		1,011	2,119	81,619	2.10	81
	Total		15,891	19,495	1,034,399	1.23	65
Third	Plantation	1940-44	242	300	12,479	1.24	52
	Cutover	1920-39	3,184	4,271	158,683	1.34	50
	Reproduction	1910-39	13,544	20,389	416,609	1.51	31
	Pole		978	871	18,082	.89	18
	Mature		329	289	6,845	.88	21
	Stream (3)		1,844	2,887	95,888	1.57	52
	Total		20,121	29,007	708,586	1.44	35
All Workings	Plantation	1945-49	989	545	16,607	.55	17
	Cutover	1940-44	2,963	4,395	2,906,229	1.48	981
	Plantation	1940-44	3,305	2,702	120,805	.82	37
	Cutover	1920-39	7,649	8,144	429,878	1.06	56
	Reproduction	1910-39	22,872	34,743	1,842,993	1.52	81
	Pole		3,668	2,533	142,176	.69	39
	Mature		1,372	1,203	32,952	.88	24
	Miscellaneous		443	981	266,420	2.21	601
	Stream (4)		3,243	7,373	461,334	2.27	142
	Total		46,504	62,619	6,219,394	1.35	134

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	3	7	65
(3)	333	544	4,345
(4)	336	551	4,410

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
INLAND EMPIRE

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
Idaho	First	EQ-Coop.	467	748	102,040		1.60	219
		FS-Reg.	2,060	4,149	2,725,806		2.01	1,323
		Total	2,527	4,897	2,827,846		1.94	1,119
	Second	EQ-Coop.	3,309	3,990	160,165		1.21	48
		FS-Reg.	4,485	7,962	403,520		1.78	90
		Total	7,794	11,952	563,685		1.53	72
	Third	EQ-Coop.	7,034	8,207	210,877	3,329	1.17	30
		FS-Reg.	10,774	19,110	420,800	851	1.77	39
		Total	17,808	27,317	631,677	4,180	1.53	35
	All Workings	EQ-Coop.	10,810	12,945	473,082	3,329	1.20	44
		FS-Reg.	17,319	31,221	3,550,126	851	1.80	205
		Total	28,129	44,166	4,023,208	4,180	1.57	143
Montana	First	FS-Reg.	3,178	4,482	340,552	65	1.41	107
	Second	FS-Reg.	1,163	2,593	77,947		2.23	67
	Third	FS-Reg.	671	1,014	35,121	165	1.51	52
	All Workings	FS-Reg.	5,012	8,089	453,620	230	1.61	91
Washington	First	FS-Reg.	4,787	4,738	1,308,011		.99	273
	Second	FS-Reg.	6,934	4,950	392,767		.71	57
	Third	FS-Reg.	1,642	676	41,788		.41	25
	All Workings	FS-Reg.	13,363	10,364	1,742,566		.78	130
Total	First	EQ-Coop.	467	748	102,040		1.60	219
		FS-Reg.	10,025	13,369	4,374,369		1.33	436
		Total	10,492	14,117	4,476,409		1.35	427
	Second	EQ-Coop.	3,309	3,990	160,165		1.21	48
		FS-Reg.	12,582	15,505	874,234		1.23	69
		Total	15,891	19,495	1,034,399		1.23	65
	Third	EQ-Coop.	7,034	8,207	210,877	3,329	1.17	30
		FS-Reg.	13,087	20,800	497,709	1,016	1.59	38
		Total	20,121	29,007	708,586	4,345	1.44	35
	All Workings	EQ-Coop.	10,810	12,945	473,082	3,329	1.20	44
		FS-Reg.	35,694	49,674	5,746,312	1,081	1.39	161
		Total	46,504	62,619	6,219,394	4,410	1.35	134

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
INLAND EMPIRE

State	Working	Number of Acres Worked																
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total						
												Federal			Other			
		National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	Total	State	Private	Total	Total
Idaho	First	1,916		64	80	2,060			10	457	467	1,916		1,916	74	537	611	2,527
	Second	3,853			632	4,485	120		1,666	1,523	3,309	3,973		3,973	1,666	2,155	3,821	7,794
	Third	8,693	185	336	1,560	10,774	802	142	3,621	2,469	7,034	9,495	327	9,822	3,957	4,029	7,986	17,808
	Total	14,462	185	400	2,272	17,319	922	142	5,297	4,449	10,810	15,384	327	15,711	5,697	6,721	12,418	28,129
Washington	First	4,787				4,787						4,787		4,787				4,787
	Second	6,617			317	6,934						6,617		6,617		317	317	6,934
	Third	1,642				1,642						1,642		1,642				1,642
	Total	13,046			317	13,363						13,046		13,046		317	317	13,363
Montana	First	2,120			1,058	3,178						2,120		2,120		1,058	1,058	3,178
	Second	1,089			74	1,163						1,089		1,089		74	74	1,163
	Third	456			215	671						456		456		215	215	671
	Total	3,665			1,347	5,012						3,665		3,665		1,347	1,347	5,012
Total	First	8,823		64	1,138	10,025			10	457	467	8,823		8,823	74	1,595	1,669	10,492
	Second	11,559			1,023	12,582	120		1,666	1,523	3,309	11,679		11,679	1,666	2,546	4,212	15,891
	Third	10,791	185	336	1,775	13,087	820	142	3,621	2,469	7,034	11,593	327	11,920	3,957	4,244	8,201	20,121
	Total	31,173	185	400	3,935	35,694	922	142	5,297	4,449	10,810	32,095	327	32,422	5,697	8,385	14,082	46,504

TABLE 6

RIBES SPECIES ERADICATED, 1945
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Plantation (1945-49)	989	8,542	8,046			19	16,607
	Cutover (1940-44)	2,611	219,295	2,679,544	268	15		2,899,122
	Plantation (1940-44)	205	6,221	27,966				34,187
	Cutover (1920-39)	2,668	80,012	75,984	2			155,998
	Reproduction (1910-39)	1,755	42,529	734,246	2			776,777
	Pole	1,350	37,171	10,807		80		48,058
	Mature	286						
	Miscellaneous	240	10,484	251,349				261,833
	Stream	388	186,043	357	705	96,722		283,827
	All Types	10,492	590,297	3,789,299	977	96,817	19	4,476,409
Second	Cutover (1940-44)	352	3,019	4,088				7,107
	Plantation (1940-44)	2,858	39,841	34,298				74,139
	Cutover (1920-39)	1,797	58,214	52,777	3,850	356		115,197
	Reproduction (1910-39)	7,573	314,033	325,955	2,000	6,725	894	649,607
	Pole	1,340	26,080	49,956				76,036
	Mature	757	20,656	5,451				26,107
	Miscellaneous	203	1,925	2,662				4,587
	Stream	1,011	73,708	1,676		6,235		81,619
	All Types	15,891	537,476	476,863	5,850	13,316	894	1,034,399
Third	Plantation (1940-44)	242	12	12,467				12,479
	Cutover (1920-39)	3,184	86,055	72,453	175			158,683
	Reproduction (1910-39)	13,544	184,429	224,802	6,005	174	1,199	416,609
	Pole	978	15,123	2,957	2			18,082
	Mature	329	5,038	1,807				6,845
	Stream	1,844	45,345	47	39,521	10,975		95,888
	All Types	20,121	336,002	314,533	45,703	11,149	1,199	708,586
All Workings	Plantation (1945-49)	989	8,542	8,046			19	16,607
	Cutover (1940-44)	2,963	222,314	2,683,632	268	15		2,906,229
	Plantation (1940-44)	3,305	46,074	74,731				120,805
	Cutover (1920-39)	7,649	224,281	201,214	4,027	356		429,878
	Reproduction (1910-39)	22,872	540,991	1,285,003	8,007	6,899	2,093	1,842,993
	Pole	3,668	78,374	63,720	2	80		142,176
	Mature	1,372	25,694	7,258				32,952
	Miscellaneous	443	12,409	254,011				266,420
	Stream	3,243	305,096	2,080	40,226	113,932		461,334
	All Types	46,504	1,463,775	4,579,695	52,530	121,282	2,112	6,219,394

TABLE 7

SUMMARY OF RIBES ERADICATION, 1923 - 1945
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes	Net Acreage Remaining Worked	Net Acreage Remaining Unworked
First	Plantation	1945-49	989	545	16,607	.55	17	989	473
	Cutover	1940-44	6,803	8,981	4,054,479	1.32	596	6,803	111,277
	Burn	1940-44	926	535	100,985	.58	109	926	246
	Plantation	1940-44	5,892	8,232	2,183,197	1.40	371	5,892	227
	Cutover	1920-39	81,302	78,065	24,720,140	.96	304	68,487	245,735
	Reproduction	1910-39	600,347	669,811	181,902,284	1.12	303	590,602	167,158
	Pole		361,723	153,335	27,928,044	.42	77	358,471	97,044
	Mature		707,717	298,328	63,236,654	.42	89	569,404	195,179
	Miscellaneous		36,476	31,689	8,111,106	.87	222	34,207	10,376
	Stream (1)		123,969	311,584	64,547,920	2.51	521	122,989	24,415
	Total		1,926,144	1,561,105	376,801,416	.81	196	1,758,770	852,130
Second	Cutover	1940-44	352	199	7,107	.57	20	352	
	Plantation	1940-44	4,026	3,750	245,686	.93	61	4,026	
	Cutover	1920-39	53,635	59,123	12,756,303	1.10	238	53,635	
	Reproduction	1910-39	176,840	214,141	21,673,186	1.21	123	175,199	
	Pole		80,972	48,211	4,435,704	.60	55	80,972	
	Mature		42,684	27,166	2,957,736	.64	69	38,974	
	Miscellaneous		4,198	5,175	880,380	1.23	210	4,198	
	Stream (2)		55,871	87,688	11,999,349	1.57	215	55,480	
	Total		418,578	445,453	54,955,451	1.06	131	412,836	
Third	Plantation	1940-44	755	1,219	63,654	1.61	84	755	
	Cutover	1920-39	18,091	22,605	1,546,249	1.25	85	18,091	
	Reproduction	1910-39	47,809	67,514	3,087,849	1.41	65	47,202	
	Pole		8,304	5,674	379,008	.68	46	8,304	
	Mature		2,504	2,139	217,441	.85	87	2,504	
	Miscellaneous		560	339	27,446	.61	49	560	
	Stream (3)		16,499	24,727	2,413,821	1.50	146	16,499	
	Total		94,522	124,217	7,735,468	1.31	82	93,915	
All Workings	Plantation	1945-49	989	545	16,607	.55	17	989	
	Cutover	1940-44	7,155	9,180	4,061,586	1.28	568	7,155	
	Burn	1940-44	926	535	100,985	.58	109	926	
	Plantation	1940-44	10,673	13,201	2,492,537	1.24	234	10,673	
	Cutover	1920-39	153,028	159,793	39,022,692	1.04	255	140,213	
	Reproduction	1910-39	824,996	951,466	206,663,319	1.15	251	813,003	
	Pole		450,999	207,220	32,742,756	.46	73	447,747	
	Mature		752,905	327,633	66,411,831	.44	88	610,882	
	Miscellaneous		41,234	37,203	9,018,932	.90	219	38,965	
	Stream (4)		196,339	423,999	78,961,090	2.16	402	194,968	
	Total		2,439,244	2,130,775	439,492,335	.87	180	2,265,521	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	23,138	54,826	1,522,080
(2)	9,298	13,252	242,794
(3)	2,118	2,478	42,720
(4)	34,554	70,556	1,807,594

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923 - 1945
INLAND EMPIRE

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
Idaho	EQ-Reg.	48,984	20,468	5,042,300	79,864	.42	103
	EQ-Coop.	210,681	119,939	21,207,886	199,036	.57	101
	EQ-Emerg.	514,942	404,100	96,874,569	213,935	.78	188
	FS-Reg.	412,771	445,967	81,860,594	459,219	1.08	198
	FS-Emerg.	337,869	216,240	56,636,775	125,491	.64	168
	CCC	590,414	661,693	123,729,240	657,303	1.12	210
	Total	2,115,661	1,868,407	385,351,364	1,734,848	.88	182
Montana	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
	EQ-Emerg.	66,076	30,787	5,775,415	1,330	.47	87
	FS-Reg.	34,833	39,169	3,875,356	8,658	1.12	111
	FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206
	CCC	14,475	12,440	1,472,009	6,325	.86	102
	Total	153,098	121,311	19,252,213	72,746	.79	126
Washington	EQ-Emerg.	64,757	63,140	17,825,782		.98	275
	FS-Reg.	47,034	38,826	9,562,483		.83	203
	FS-Emerg.	36,366	14,386	4,013,260		.40	110
	CCC	22,328	24,705	3,487,233		1.11	156
	Total	170,485	141,057	34,888,758		.83	205
Idaho Montana Washington	EQ-Reg.	50,986	23,763	5,804,010	114,659	.47	114
	EQ-Coop.	210,681	119,939	21,207,886	199,036	.57	101
	EQ-Emerg.	645,775	498,027	120,475,766	215,265	.77	187
	FS-Reg.	494,638	523,962	95,298,433	467,877	1.06	193
	FS-Emerg.	409,947	266,246	68,017,758	147,129	.65	166
	CCC	627,217	698,838	128,688,482	663,628	1.11	205
	Total	2,439,244	2,130,775	439,492,335	1,807,594	.87	180

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923 - 1945
INLAND EMPIRE

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	849,063	210,490	39,855	1,099,408	259,052	1,108,115
	Public Domain	16,362	5,840	1,366	23,568	12,692	29,054
	Subtotal Federal	865,425	216,330	41,221	1,122,976	271,744	1,137,169
	State	233,166	52,251	14,552	299,969	115,061	348,227
	Private	418,692	97,140	22,715	538,547	349,376	768,068
	Subtotal Other	651,858	149,391	37,267	838,516	464,437	1,116,295
	Total	1,517,283	365,721	78,488	1,961,492	736,181	2,253,464
Montana	National Forest	112,229	9,766	2,739	124,734	60,422	172,651
	Public Domain	40			40		40
	Subtotal Federal	112,269	9,766	2,739	124,774	60,422	172,691
	State	734	1		735	173	907
	Private	19,341	2,254	1,766	23,361	15,114	34,455
	Subtotal Other	20,075	2,255	1,766	24,096	15,287	35,362
	Total	132,344	12,021	4,505	148,870	75,709	208,053
Washington	National Forest	85,735	23,735	6,241	115,711	34,913	120,648
	Public Domain	315	60		375		315
	Subtotal Federal	86,050	23,795	6,241	115,086	34,913	120,963
	State	6,832	3,935	2,114	12,881	988	7,820
	Private	16,261	7,364	2,567	26,192	4,339	20,600
	Subtotal Other	23,093	11,299	4,681	39,073	5,327	28,420
	Total	109,143	35,094	10,922	155,159	40,240	149,383
Total	National Forest	1,047,027	243,991	48,835	1,339,853	354,387	1,401,414
	Public Domain	16,717	5,900	1,366	23,983	12,692	29,409
	Subtotal Federal	1,063,744	249,891	50,201	1,363,836	367,079	1,430,823
	State	240,732	56,187	16,666	313,585	116,222	356,954
	Private	454,294	106,758	27,048	588,100	368,829	823,123
	Subtotal Other	695,026	162,945	43,714	901,685	485,051	1,180,077
	Total	1,758,770	412,836	93,915	2,265,521	852,130	2,610,900

TABLE 10

RIBES SPECIES ERADICATED, 1923 - 1945
INLAND EMPIRE

Working	Eradication Type	Gross Acres	Ribes Species								Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triets	Ribes acerifolium	
First	Plantation (1945-49)	989	8,542	8,046			19				16,607
	Cutover (1940-44)	6,803	356,483	3,684,465	13,516	15					4,054,479
	Burn (1940-44)	926	65,034	35,951							100,985
	Plantation (1940-44)	5,892	594,502	1,588,087	161		447				2,183,197
	Cutover (1920-39)	81,302	8,125,912	16,376,951	81,192	95,981	40,104				24,720,140
	Reproduction (1910-39)	600,347	50,533,918	129,439,132	205,600	1,213,321	505,650	3,518	1,145		181,902,234
	Pole	361,723	14,274,324	12,961,745	65,233	388,599	233,465	302	462	3,914	27,928,044
	Mature	707,717	42,466,027	19,658,542	224,608	403,562	474,605	7,257	26	2,027	63,236,654
	Miscellaneous	36,476	2,554,147	5,394,493	19,825	113,585	29,056				8,111,106
	Stream	123,969	42,763,273	2,009,316	6,396,554	13,188,613	116,220	33,105	21,255	19,584	64,547,920
	All Types	1,926,144	161,742,182	191,156,728	7,006,689	15,403,676	1,399,566	44,182	22,888	25,525	376,801,416
Second	Cutover (1940-44)	352	3,019	4,088							7,107
	Plantation (1940-44)	4,026	141,422	104,264							245,686
	Cutover (1920-39)	53,635	3,644,439	8,998,235	61,458	30,797	21,374				12,756,303
	Reproduction (1910-39)	176,840	7,804,538	13,657,304	61,208	122,201	25,344		2,591		21,673,186
	Pole	80,972	2,182,376	2,184,903	26,757	39,928	1,740				4,435,704
	Mature	42,684	1,503,712	1,386,525	15,768	15,305	36,159		267		2,957,736
	Miscellaneous	4,198	257,330	616,728	5,447	875					880,360
	Stream	55,871	6,981,531	807,873	2,412,008	1,609,766	32,190		155,981		11,999,349
	All Types	418,578	22,518,367	27,759,920	2,582,646	1,818,872	116,807		158,839		54,955,451
Third	Plantation (1940-44)	755	46,619	17,035							63,654
	Cutover (1920-39)	18,091	617,266	907,371	16,468	5,001	143				1,546,249
	Reproduction (1910-39)	47,809	1,292,072	1,766,078	16,618	11,537	1,430		114		3,087,849
	Pole	8,304	195,647	182,382	44	929	6				379,008
	Mature	2,504	128,005	87,700	8		1,728				217,441
	Miscellaneous	560	8,659	18,763		24					27,446
	Stream	16,499	1,187,096	32,063	645,487	531,043	8		18,124		2,413,821
	All Types	94,522	3,475,364	3,011,392	678,625	548,534	3,315		18,238		7,735,468
All Workings	Plantation (1945-49)	989	8,542	8,046			19				16,607
	Cutover (1940-44)	7,155	359,502	3,688,553	13,516	15					4,061,586
	Burn (1940-44)	926	65,034	35,951							100,985
	Plantation (1940-44)	10,673	782,543	1,709,386	161		447				2,492,537
	Cutover (1920-39)	153,028	12,387,617	26,282,557	159,118	131,779	61,521				39,022,692
	Reproduction (1910-39)	824,996	59,630,528	144,862,514	283,426	1,347,059	532,424	3,518	3,850		206,663,319
	Pole	450,999	16,652,347	15,329,030	92,034	429,456	235,211	302	462	3,914	32,742,756
	Mature	752,905	44,097,744	21,132,767	240,384	418,867	512,492	7,257	293	2,027	66,411,831
	Miscellaneous	41,234	2,820,136	6,029,984	25,272	114,484	29,056				9,018,932
	Stream	196,339	50,931,900	2,849,252	9,454,049	15,329,422	148,418	33,105	195,360	19,584	78,961,090
	All Types	2,439,244	187,735,893	221,928,040	10,267,960	17,771,082	1,519,688	44,182	199,965	25,525	439,492,335

BLISTER RUST CONTROL WORK, CLEARWATER OPERATION, 1945

By

H. J. Faulkner, Operation Supervisor
Byron C. Amsbaugh, Forest Officer

INTROLUCTION

The white pine blister rust control program on the Clearwater Operation, during the 1945 season was carried on with five camps operated by the Forest Service and three by the Bureau of Entomology. Student labor again made up the bulk of the crews. Three of the Forest Service camps were manned with student labor, one with German Internees and one with Mexican Nationals. The Bureau camps were manned entirely with teen-age boys.

In general the student workers were improved over last year. This was particularly true in the Forest Service camps where the rate of turnover was less than in previous years, but fire assignments were more numerous and of longer duration. Consequently, the work accomplishment was considerably less than it would have been if the crews could have been undisturbed.

While only a few German Internees were employed on blister rust control their quality of work and output per man-day of employment were above average for other classes of labor on the forest.

Mexican Nationals were employed from July 20 to September 26. Fire assignments disrupted this program to a large extent but poorer results were obtained by this class of labor than any of the others. Wet weather during the fall plus additional camp maintenance personnel required by the 40-hour week made the cost of this class of labor excessive. The following table shows accomplishments for the different classes of labor:

Labor	Number Workers	Acres	Ribes Eradication Man-Days	Ribes
Student	317	5,814	9,502	466,134
Mexican Nationals	123	405	2,248	2,579,505
German Internees	20	652	664	21,980
Total	460	6,871	12,414	3,067,619

ORGANIZATION AND ADMINISTRATION

The organization of field activities was the same as during the 1944 season with no change in previous working agreements with cooperating agencies.

The blister rust control field organization was as follows:

Bureau of Entomology and Plant Quarantine	U. S. Forest Service
H. J. Faulkner, Operation Supervisor	B. C. Amsbaugh, Forest Officer
J. C. Gonyou, Checker Foreman	

Program	Number Camps	Number Workers	Number Checkers
EQ-Cooperative	3	128	2
FS-Regular	5	329	1

Total number employed on blister rust control 460.

The old Reed's Ranch CCC camp again served as a field headquarters, operating and supply base for the Bureau. The Forest Service camps were administered and supplied from the Pierce Ranger Station.

The first camp was established on May 22 and the last camp, for Mexican Nationals, on July 21. All student camps were closed by August 26. The Mexican camp operated until September 26. Considerable difficulty was encountered in establishing camps during late May and June due to heavy rains which made roads practically impassable. To alleviate this condition portable messhalls and some other heavy equipment were left at the camp sites if the same camps were to be occupied the following season. Damage to this type of equipment from weathering is not excessive and is more than offset by the saving in trucking costs.

LOCATION AND DESCRIPTION OF AREAS

Forest Service

Drainage	Township	Range	Section	Work Performed in Sections
Three Mile Creek	37N	5E	27	21, 22, 27, 28, 34
Orogrande Creek	37N	7E	3	2, 3, 4
	38N	7E		25, 32, 33, 35, 36
	38N	8E		30
Sylvan Creek	37N	7E	28	28, 33
Washington Creek	39N	6E	35	25, 36
	38N	6E		1, 2
Sheep Mountain Creek	39N	6E	2	
	40N	6E		36
	40N	7E		30, 31

Bureau of Entomology and Plant Quarantine

*Orofino Creek	36N	5E	10	10, 13, 14, 15, 23
Cow Creek	37N	4E	15	13, 14, 15, 16, 20, 22, 23, 24
Scofield Creek	39N	6E	33	27, 34
Deer Creek	38N	5E	13	13, 24

*Located at Blister Rust headquarters. Combined with Deer Creek camp on July 6.

The Three Mile Creek camp performed third working on Three Mile and Quartz Creek drainages. The area was cut over in 1928 and as a result of previous workings the ribes population was generally light. Due to heavy grazing, many ribes were difficult to find due to their stunted growth and screening by other brush and herbaceous vegetation. Part of the area supported a dense growth of brush resulting in difficult working conditions and slow progress by the crews. It is anticipated that only light spot working will be necessary in the future to bring this area through to maturity with a well-stocked stand of white pine.

The Orogrande Camp performed work on stream and stream zone along Orogrande Creek from the mouth of French Creek to approximately the mouth of Mill Creek. This was third eradication in the stream type. The stream type is surrounded by mature and pole stands of white pine supporting few ribes. Working was performed to remove the heavier concentrations of ribes in the stream type and stream zone. This working should suffice until the adjoining stands are logged.

The Sylvan Creek Camp performed second working in plantations established in 1939 and 1940. The area received a heavy burn in 1931 and ribes populations have stabilized. Due to the heavy demand for fire fighting and the resultant loss of man power on ribes eradication, it will require a portion of another camp season to complete this area. An extension of the protection boundary above the planted area will also be necessary to insure adequate protection of the plantation.

Washington Creek Camp performed both chemical and hand eradication in an advanced reproduction stand which became established after a 1914 burn and 1922 reburn. This was second working of the upland. Ribes concentrations were fairly heavy and working conditions were difficult due to windfalls, brush and density of reproduction. Another working will be necessary to insure protection of the area.

The Sheep Mountain Camp performed initial work in area cut over in 1943. A 50-acre slash fire occurred in the fall of 1943. This burn was clear cut in 1944. The area supported a very heavy concentration of ribes. A long period of germination is not anticipated in the burned area and another working in two or three years may suffice for protection.

The Orofino Creek crew, working out of Blister Rust Control Headquarters, performed first and second workings in cut-over areas. Heavy cutting and considerable disturbance of the soil at the time of cutting caused numerous ribes to germinate and additional workings will be necessary to establish protection. Working conditions are generally favorable on these recently cut-over areas due to the fact that ribes are small and a heavy brush cover has not had time to become established since logging. However, due to the small size of the ribes a considerable amount of searching time is necessary.

The Cow Creek Camp worked on lands which were logged from 1930 to 1934. Working conditions were generally difficult due to heavy brush, windfalls and large ribes. Due to the small control programs since 1937, follow-up workings were delayed on this area resulting in considerable blister rust damage.

Working was also more costly and difficult due to the heavy brush cover and windfalls which were not present to such an extent at the time the rework should have been done.

The Scofield Camp performed second hand eradication on upland type and third chemical eradication of Ribes petiolare on stream type. Working conditions are difficult on this area due to the size and density of brush and reproduction. The stand was established following a 1914 and 1922 burn. First working was done in the years 1934 to 1937 but due to a reduction in the program after 1937 reworking which should have followed in 3 years was delayed until 1943. As a result of this delay considerable damage has resulted which is more serious in this age class than in younger stands.

The Deer Creek Camp performed second eradication on a 1935 cut-over area. Working conditions were quite favorable but numerous small ribes in association with heavy vegetation make eradication difficult. A third working will be necessary on parts of the area to insure protection.

METHODS AND EQUIPMENT

The same methods were used this year as during the 1944 season. The working of three to four 3-man crews together under the supervision of a straw boss has proven to be the most satisfactory method for the student class of labor.

Several new items of camp equipment were used this year including portable tent floors and frames, portable bathhouse and improved type of stove for heating crew quarters.

STATUS OF CONTROL

Present established young stands on the Clearwater National Forest could be placed on maintenance within the next three or four years with approximately the same size program as this year if a high quality of labor and supervision were available.

Increased cutting on National Forest land, burned-over area and timber stand improvement projects in the postwar years may necessitate a large sized program for several additional years. Better correlation of timber cutting practices and blister rust control will undoubtedly reduce the amount of work necessary on cut-over areas. In the event of a light, forestwide harvest cutting the blister rust program may need to be larger for a few years to insure that all ribes concentrations developing from logging are eradicated at the proper time.

The planned objective is to place existing young stands of white pine on a maintenance basis at an early date to avoid periodic fluctuations in the size of the organization required to protect additional areas coming into the work program.

From an organizational and work accomplishment standpoint a stable program of sufficient size to warrant protection at the proper time is desirable.

Status of control on the Clearwater Timber Protective Association lands as a result of large-scale logging operations and small control programs continues to be unfavorable as described in previous reports. The amount of unworked cut-over land is increasing from year to year. The need for initial work to protect the new white pine coming in on these areas plus the necessary rework in older reproduction stands resulting from earlier cutting continues to be far in excess of the present eradication program.

CHECKING AND SURVEYS

Checking was carried on this year with three teen-age boys working under the constant supervision of a checking foreman. The boys had at least one year previous eradication experience and with intensive training and constant supervision they performed satisfactory work.

After the close of the regular season an advance survey was run on 2,080 acres of recently cut-over land. In addition to ribes data, information was taken on white pine stocking and residual stand.

Pine disease surveys consisted of inspection by the permanent personnel throughout the season.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 15,181.34
	Regular BLR-3-4	34,482.34
	Subtotal	$ 49,663.68
State of Idaho	State BLR-3-4	2,571.66
Clearwater Timber Protective Association	Private BLR-3-4	2,088.33
	Subtotal	$ 4,659.99
Forest Service	Regular BLR-4	$115,767.36
Total		$170,091.03

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
CLEARWATER OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	Total
Sal. perm. men	$ 8,808.79			$ 8,808.79	$ 4,497.55	$ 13,306.34
Sal. temp. men	1,331.09	$ 7,356.62	$ 680.25	9,367.96	8,398.78	17,766.74
Wages, temp. labs.	3,159.87	21,747.70	3,636.23	28,543.80	72,798.34	101,342.14
Subs. supplies	810.13	3,845.71	343.01	4,998.85	21,814.46	26,813.31
Equipment	161.58	414.81		576.39	2,775.18	3,351.57
Travel & transp.	588.59	377.52		966.11	3,260.00	4,226.11
Other supplies	321.29	739.98	.50	1,061.77	2,223.05	3,284.82
Total	$15,181.34	$34,482.34	$4,659.99	$54,323.67	$115,767.36	$170,091.03

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
CLEARWATER OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
First	Cutover	1940-44	514	2,325	2,631,741	4.52	5,120
	Cutover	1920-39	158	205	12,464	1.30	79
	Total		672	2,530	2,644,205	3.76	3,935
Second	Cutover	1920-39	1,123	1,093	57,810	.97	51
	Reproduction	1910-39	1,173	2,981	175,296	2.54	149
	Total		2,296	4,074	233,106	1.77	102
Third	Cutover	1920-39	995	1,400	54,929	1.41	55
	Reproduction	1910-39	2,236	3,493	102,446	1.56	46
	Stream (3)		672	917	32,933	1.36	49
	Total		3,903	5,810	190,308	1.49	49
All Workings	Cutover	1940-44	514	2,325	2,631,741	4.52	5,120
	Cutover	1920-39	2,276	2,698	125,203	1.19	55
	Reproduction	1910-39	3,409	6,474	277,742	1.90	81
	Stream (4)		672	917	32,933	1.36	49
	Total		6,871	12,414	3,067,619	1.81	446

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(3)	45	253	3,651
(4)	45	253	3,651

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
CLEARWATER OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
Idaho	First	EQ-Coop.	352	632	75,122		1.80	213
		FS-Reg.	320	1,898	2,569,083		5.93	8,028
		Total	672	2,530	2,644,205		3.76	3,935
	Second	EQ-Coop.	1,573	2,323	109,510		1.48	70
		FS-Reg.	723	1,751	123,596		2.42	171
		Total	2,296	4,074	233,106		1.77	102
	Third	EQ-Coop.	1,015	1,567	63,329	2,800	1.54	62
		FS-Reg.	2,888	4,243	126,979	851	1.47	44
		Total	3,903	5,810	190,308	3,651	1.49	49
	All Workings	EQ-Coop.	2,940	4,522	247,961	2,800	1.54	84
		FS-Reg.	3,931	7,892	2,819,658	851	2.01	717
		Total	6,871	12,414	3,067,619	3,651	1.81	446

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
CLEARWATER OPERATION

State	Working	Acres Worked: By Forest Service: National Forest	By Forest Service: State	By Forest Service: Private	By Forest Service: Total	By Bureau of Entomology and Plant Quarantine: National Forest	By Bureau of Entomology and Plant Quarantine: State	By Bureau of Entomology and Plant Quarantine: Private	By Bureau of Entomology and Plant Quarantine: Total	Total: Federal: National Forest	Total: Other: State	Total: Other: Private	Total: Other: Total	Total: Total
Idaho	First	256	64		320		10	342	352	256	74	342	416	672
	Second	401		322	723	120		1,453	1,573	521		1,775	1,775	2,296
	Third	1,840	72	976	2,888		65	950	1,015	1,840	137	1,926	2,063	3,903
	Total	2,497	136	1,298	3,931	120	75	2,745	2,940	2,617	211	4,043	4,254	6,871

TABLE 6

RIBES SPECIES ERADICATED, 1945
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Cutover (1940-44)	514	123,038	2,508,451	252	2,631,741
	Cutover (1920-39)	158	8,905	3,557	2	12,464
	All Types	672	131,943	2,512,008	254	2,644,205
Second	Cutover (1920-39)	1,123	13,862	40,098	3,850	57,810
	Reproduction (1910-39)	1,173	144,196	29,100	2,000	175,296
	All Types	2,296	158,058	69,198	5,850	233,106
Third	Cutover (1920-39)	995	8,957	45,797	175	54,929
	Reproduction (1910-39)	2,236	26,586	69,920	5,940	102,446
	Stream	672	6,743		26,190	32,933
	All Types	3,903	42,286	115,717	32,305	190,308
All Workings	Cutover (1940-44)	514	123,038	2,508,451	252	2,631,741
	Cutover (1920-39)	2,276	31,724	89,452	4,027	125,203
	Reproduction (1910-39)	3,409	170,782	99,020	7,940	277,742
	Stream	672	6,743		26,190	32,933
	All Types	6,871	332,287	2,696,923	38,409	3,067,619

TABLE 7

SUMMARY OF RIBES ERADICATION, 1929-1945
CLEARWATER OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	2,987	6,049	3,690,853	2.03	1,236	2,987	24,143
	Plantation	1940-44	60	232	134,749	3.87	2,246	60	
	Cutover	1920-39	35,848	36,357	13,761,086	1.01	384	23,607	32,812
	Reproduction	1910-39	71,329	108,331	33,428,751	1.52	469	71,329	4,248
	Pole		29,925	17,137	3,828,386	.57	128	29,925	6,331
	Mature		219,289	99,880	23,422,354	.46	107	181,949	40,910
	Miscellaneous		5,852	3,900	1,700,804	.67	291	5,852	7,819
	Stream (1)		42,353	78,124	14,058,124	1.84	332	42,353	13,675
	Total		407,643	350,010	94,025,107	.86	231	358,062	129,938
Second	Plantation	1940-44	60	194	15,587	3.23	260	60	
	Cutover	1920-39	30,343	29,534	7,902,339	.97	260	30,343	
	Reproduction	1910-39	23,462	36,011	3,518,600	1.53	150	23,462	
	Pole		13,995	7,892	1,110,792	.56	79	13,995	
	Mature		16,067	7,801	811,832	.49	51	14,167	
	Miscellaneous		511	573	371,107	1.12	726	511	
	Stream (2)		23,780	26,966	3,329,143	1.13	140	23,780	
	Total		108,218	108,971	17,059,400	1.01	158	106,318	
Third	Cutover	1920-39	10,832	12,368	922,096	1.14	85	10,832	
	Reproduction	1910-39	5,646	7,698	379,216	1.36	67	5,646	
	Stream (3)		3,260	3,672	329,107	1.13	101	3,260	
	Total		19,738	23,738	1,630,419	1.20	83	19,738	
All Workings	Cutover	1940-44	2,987	6,049	3,690,853	2.03	1,236	2,987	
	Plantation	1940-44	120	426	150,336	3.55	1,253	120	
	Cutover	1920-39	77,023	78,259	22,585,521	1.02	293	64,782	
	Reproduction	1910-39	100,437	152,040	37,326,567	1.51	372	100,437	
	Pole		43,920	25,029	4,939,178	.57	112	43,920	
	Mature		235,356	107,681	24,234,186	.46	103	196,116	
	Miscellaneous		6,363	4,473	2,071,911	.70	326	6,363	
	Stream (4)		69,393	108,762	17,716,374	1.57	255	69,393	
	Total		535,599	482,719	112,714,926	.90	210	484,118	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	15,027	31,179	794,484
(2)	5,875	8,142	119,985
(3)	750	1,195	18,663
(4)	21,652	40,516	933,132

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1945
CLEARWATER OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
Idaho	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256
	EQ-Coop.	43,766	38,544	5,756,715	138,922	.88	132
	EQ-Emerg.	133,970	125,277	30,398,093	136,847	.94	227
	FS-Reg.	110,061	102,375	28,294,225	144,887	.93	257
	FS-Emerg.	55,908	45,382	14,895,022	24,015	.81	266
	CCC	187,482	165,868	32,241,643	408,597	.88	172
	Total	535,599	482,719	112,714,926	933,132	.90	210

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929 - 1945
CLEARWATER OPERATION

State	Ownership	Net Acres in Control Area: Acres Worked: First	Second	Third	Total	Acres Unworked	Total Acres
Idaho	National Forest	150,526	49,795	6,773	207,094	49,826	200,352
	Public Domain	3,680	628	12	4,320	350	4,030
	Subtotal Federal	154,206	50,423	6,785	211,414	50,176	204,382
	State	63,802	13,762	1,322	78,886	26,456	90,258
	Private	140,054	42,133	11,631	193,818	53,306	193,360
	Subtotal	203,856	55,895	12,953	272,704	79,762	283,618
	Total	358,062	106,318	19,738	484,118	129,938	488,000

TABLE 10

RIBES SPECIES ERADICATED, 1929-1945
CLEARWATER OPERATION

Working	Eradication Type	Gross Acres	Ribes Species: Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	Total Ribes
First	Cutover (1940-44)	2,987	204,248	3,473,105	13,500				3,690,853
	Plantation (1940-44)	60	32,168	102,581					134,749
	Cutover (1920-39)	35,848	2,326,615	11,322,029	72,862	28,370	11,210		13,761,086
	Reproduction (1910-39)	71,329	7,928,610	25,245,707	75,977	47,326	131,131		33,428,751
	Pole	29,925	2,510,390	1,278,821	31,617	6	7,090	462	3,828,386
	Mature	219,289	16,261,450	6,795,503	197,832	107,922	59,621	26	23,422,354
	Miscellaneous	5,852	338,812	1,329,256	17,838	114	14,284		1,700,804
	Stream	42,353	10,239,770	324,583	2,766,543	701,834	25,394		14,058,124
	All Types	407,643	39,842,063	49,872,085	3,176,169	885,572	248,730	488	94,025,107
Second	Plantation (1940-44)	60	6,747	8,840					15,587
	Cutover (1920-39)	30,343	1,053,331	6,777,133	59,693	106	12,076		7,902,339
	Reproduction (1910-39)	23,462	991,049	2,503,913	23,598	4	36		3,518,600
	Pole	13,995	545,661	548,785	16,095	1	250		1,110,792
	Mature	16,067	395,208	400,473	15,768	116		267	811,832
	Miscellaneous	511	19,861	345,799	5,447				371,107
	Stream	23,780	1,893,616	516,470	826,524	76,716	9,141	6,676	3,329,143
	All Types	108,218	4,905,473	11,101,413	947,125	76,943	21,503	6,943	17,059,400
Third	Cutover (1920-39)	10,832	159,590	745,895	16,468		143		922,096
	Reproduction (1910-39)	5,646	171,244	200,084	7,874		14		379,216
	Stream	3,260	195,521	2,573	108,197	22,816			329,107
	All Types	19,738	526,355	948,552	132,539	22,816	157		1,630,419
All Workings	Cutover (1940-44)	2,987	204,248	3,473,105	13,500				3,690,853
	Plantation (1940-44)	120	38,915	111,421					150,336
	Cutover (1920-39)	77,023	3,539,536	18,845,057	149,023	28,476	23,429		22,585,521
	Reproduction (1910-39)	100,437	9,090,903	27,949,704	107,449	47,330	131,181		37,326,567
	Pole	43,920	3,056,051	1,827,606	47,712	7	7,340	462	4,939,178
	Mature	235,356	16,656,658	7,195,976	213,600	108,038	59,621	293	24,234,186
	Miscellaneous	6,363	358,673	1,675,555	23,285	114	14,284		2,071,911
	Stream	69,393	12,328,907	843,626	3,701,264	801,366	34,535	6,676	17,716,374
	All Types	535,599	45,273,891	61,922,050	4,255,833	985,331	270,390	7,431	112,714,926

BLISTER RUST CONTROL WORK, ST. JOE OPERATION, 1945

By
F. J. Heinrich, Operation Supervisor
D. J. Moore, Pathologist, U. S. Forest Service
W. F. Painter, Assistant Operation Supervisor
F. A. Moore, Unit Supervisor, U. S. Forest Service

INTRODUCTION

The St. Joe operation comprises 884,925 acres of white pine type in the north Idaho counties of Benewah, Shoshone and Clearwater. Of the total area 27 percent is cut-over, 32 percent reproduction, 15 percent pole, 25 percent mature and 1 percent miscellaneous types.

At the close of the 1945 field season 538,530 acres have been worked initially and 179,633 acres reworked. Of the total acreage worked 151,373 acres have been placed in the maintenance classification.

ORGANIZATION AND ADMINISTRATION

Control activities on the St. Joe operation were organized in accordance with agreements between federal, state and private agencies and in accordance with provisions of the Appropriations Act. Personnel of the Bureau of Entomology and Plant Quarantine provided assistance in the over-all planning, coordination and technical direction of the program on lands of all ownership and administered the work of the three camps on state and private lands. The Forest Service administered the work of eight camps on National Forest lands. Three were teen-age boy camps which they maintained only through June 30. On July 1 the personnel from these camps were transferred to the Bureau for the remainder of the season.

The blister rust control 1945 field organization was as follows:

Bureau of Entomology and Plant Quarantine	U. S. Forest Service
F. J. Heinrich, Operation Supervisor	D. J. Moore, Forest Officer
W. F. Painter, Assistant Operation Supervisor in charge of checking	F. A. Moore, Unit Supervisor
	H. W. Seaman, Unit Supervisor

Program	Number Camps	Number Workers	Number Checkers
*E.Q. - Cooperative	3	185	3
*F.S. - Regular	8	365	4

Total number employed on blister rust control - 550

*Bureau financed 1 teen-age boys camp through June 30. The 3 teen-age boys camps financed by the Forest Service through June 30 were transferred to Bureau funds on July 1.

Field headquarters at Clarkia, Idaho maintained by the Bureau was used as an operating base for all Bureau and some Forest Service activities. Warehousing and supplying of subsistence for the Forest Service camps were handled through the Clarkia Ranger Station warehousing facilities.

Fully realizing the seriousness of the blister rust control problem the Bureau, Forest Service and all cooperating agencies made an exerted effort in recruiting laborers and supervisory personnel for field work. The laborers obtained were teen-age boys and Mexican Nationals.

Recruitment for the Bureau camps was handled by the Blister Rust Control Office in Spokane, Washington. The Forest Service teen-age boys were secured locally, through forestry schools and by recruitment in the various regions. Inexperienced boys 16 years of age comprised the majority of workers in the boys camps. Work accomplishments in output and efficiency were comparable to that of last year. Personnel turnover and the short school vacation resulted in a short employment period for teen-age employees, the average being 21 days for the season.

Mexican Nationals were secured through the War Food Administration for blister rust control work in the Forest Service camps. One hundred thirty reported in early April and were engaged in pruning for removal of blister rust cankers. They were transferred to the beet fields in mid-May and returned for blister rust work in early July and continued until September 20.

The maximum number of Mexican Nationals employed on blister rust control work after July was 340. These men averaged about 25 years of age and adapted themselves well to woods work and camp life. Accomplishments on canker removal work were very good. Results on actual ribes eradication were not too satisfactory. The two primary reasons being, (1) the lack of adequate supervision and (2) the amount of time spent on fire suppression. The need for adequate supervision was realized and an early exerted effort was made to fill these needs but the men could not be secured.

Accomplishments on blister rust control field work by different classes of labor are shown in the following table:

	RIBES ERADICATION				CANKER ELIMINATION	
Labor	Number Workers	Acres	Man-Days	Ribes	Trees Treated	Man-Days
Student	185	4,897	6,680	82,347		
Mexican National	340	4,527	9,116	160,007	135,325	2,334

LOCATION AND DESCRIPTION OF AREAS

Cooperative camps on state and private land.

1. Squaw Meadow area, camp 201, established May 21, closed August 25.

Area located in Squaw, Shattuck and Lindley Creek drainages in secs. 21, 22, 27, 28, 29, 32, 33 and 34, T. 40 N., R. 1 E. This block comprises

over 3,000 acres of well-stocked white pine reproduction established in 1918. Of this total only 1,886 acres required working. Ribes were small and scattered averaging approximately 12 per acre. Satisfactory efficiency was accomplished by the crew this summer.

Infection is general throughout this area and some damage from the rust has occurred. Fortunately, however, many of the trees are producing seed and young trees are being established. Another season's work still remains from this camp site.

2. Gold Center area, camp 202, established May 9, closed August 25.

Worked area located in secs. 1, 2, 11, 12, 13, 14 and 23, T. 42 N., R. 2 E. All area worked was third working and comprised 832 acres of open reproduction, 258 acres pole and 168 acres of stream type. Ribes removed averaged 32 per acre. One of the early known infection centers lay in the NW. ¼ of the NW. ¼, sec. 12, extending from the stream to five chains in the upland type. This is a pole stand and the infection heavy with many trunk cankers present.

This camp was established by the Forest Service and manned by Mexican Nationals from May 9-18 and by teen-age boys after June 9. The Forest Service financed the camp through June 30. On July 1 the camp was taken over by the Bureau of Entomology and Plant Quarantine and carried for the remainder of the season.

3. Hidden Creek area, camp 204, established April 6, closed August 4.

Worked area located in secs. 21, 26, 27, 28, 29 and 35, T. 42 N., R. 1 E. Area worked from this camp consisted of 584 acres of white pine reproduction, third working. The average number of ribes removed was 35 per acre.

Considerable difficulty was encountered in obtaining efficient work on this area. This was due primarily to poor supervision.

This camp was established by the Forest Service as camp 252 and manned by Mexican Nationals engaged in canker removal work from April 6 to May 18. Boys occupied this camp from June 1 to June 30 under Forest Service supervision. The Bureau took over the camp and handled it through the remainder of the season.

Infection is general throughout the area. Canker removal work was performed on areas in secs. 23, 26, 27 and 34, T. 42 N., R. 1 E.

Forest Service Camps on Federal Land

1. Old Ranger Station Area, camp 251, established April 6, closed September 26.

Work area located in secs. 1, 2, 11, 12, 13, 14 and 24, T. 42 N., R. 1 E., and sec. 7, T. 42 N., R. 2 E. A total of 1,886 acres upland and 177 acres stream type were worked. This camp was occupied early in April by Mexican Nationals who worked mostly on removal of blister rust cankers.

Boys under Forest Service supervision manned the camp from June 1-30. The Bureau took over and ran the camp from July 1-15. On July 15 the boys were transferred to other camps. Mexican Nationals occupied the camp on July 16 and worked from this location for the remainder of the season.

Canker removal work was performed in secs. 11, 12, 13 and 14, T. 42 N., R. 1 E.

2. Marble Creek Unit.

The following areas designated as Bussel, Toles, Cranberry and Norton Creeks constitute a portion of the Marble Creek Unit. This unit comprises 6,420 acres of thrifty well-stocked white pine reproduction which was established following a fire in 1922. Infection is general throughout the stand and some damage has taken place. It appears that the trees lost will be replaced through natural seeding which is already taking place.

3. Bussel Creek Area, camp 253, established June 11, closed September 19.

Worked area lay in secs. 25, 35, and 36, T. 44 N., R. 2 E., and secs. 3 and 4, T. 43 N., R. 2 E. A total of 571 acres of open reproduction was worked by this camp, all being third working.

4. Toles Creek Area, camp 254, established July 4, closed September 19.

Worked area located primarily in Bear and Little Bear Creek drainages, secs. 13, 23, 24, 25 and 26, T. 44 N., R. 2 E., and sec. 19, T. 44 N., R. 3 E. Area worked consisted of 835 acres reproduction and 145 acres cut-over, all third working.

5. Cranberry Creek Area, camp 255, established July 9, closed September 19.

Worked area lay in secs. 25 and 36, T. 44 N., R. 2 E. and secs. 19, 20, 29, 30, 31 and 32, T. 44 N., R. 3 E. A total of 1,121 acres were worked all being third working. The ribes averaged 24 per acre.

6. Norton Creek Area, camp 256, established July 17, closed September 19.

Worked area located in secs. 25, 26, 27, 34, 35 and 36, T. 44 N., R. 2 E. Area worked consisted of 582 acres of reproduction all being third working.

7. Lucky Swede Creek Area, camp 257, established July 10, closed September 22.

Worked area located in sec. 5, T. 46 N., R. 6 E. and secs. 26, 27 and 34, T. 47 N., R. 5 E. Twenty-eight acres of first working and 63 acres of second working in sec. 26. The remainder of work area was third working in open reproduction type.

This area is part of the North Fork of the St. Joe River unit which is made up of several scattered but thrifty well-stocked plantations established in 1914-15. In most cases the white pine appears only on the north and west exposures. Yellow pine has been planted on the dry south slopes.

Working conditions on this unit are difficult due to the presence of windfalls, brush density and in some cases steep rocky slopes.

Although blister rust has been established in this area for several years there has been little intensification and no serious damage has resulted.

METHODS AND EQUIPMENT

Standard approved methods for hand ribes eradication used last year were applied again throughout the season. In most cases three men worked in each lane with a rework man directly behind. Crews were worked in gang formation with a straw boss in direct charge of three to four crews. This method provided the necessary close supervision which was needed for both the teen-age boys and Mexican Nationals.

The use of Atlacide for chemical ribes eradication was confined to mop-up work and the spraying of a few isolated patches. Ammonium sulfamate was used in treating 40 acres on Bechtel Creek and 188 acres on St. Maries River near Clarkia, Idaho, all being stream type. Atlacide was used only on Ribes petiolare while the ammonium sulfamate was applied on R. petiolare, R. lacustre and R. inerme. One hundred fifty man-days were spent in treating the 228 acres. Had hand eradication methods been used it would have taken over 300 man-days.

A training school was held for blister rust supervisory personnel in May. These men were given complete schooling in all phases of eradication work. Straw bosses and crew men were given thorough training on the job.

All blister rust supervisory personnel and crew men were given intensive training in the use of tools and fire suppression. A fire training school was held at each camp with the exception of the Bureau camp 201 located at Elk River, Idaho.

CHECKING

The method of checking areas by working two teen-age boys together along a check strip was continued during the 1945 season. This method was described in detail under "checking" in the 1944 St. Joe Operation report.

Three checkers from the 1944 field season reported for work by mid-June. Three additional boys were trained to work with the three experienced boys. One checker foreman assisted in the direction of the work until mid-July.

Generally the check on areas worked by the teen-age boys conformed with the established standards. The work performed by Mexican laborers was not up to standard quality. Practically all the areas worked will require rework to place them in a satisfactory status.

A total of 9,424 acres worked during 1945 were inspected during the season. Approximately 3,000 acres classified as maintenance and post check within the 1945 camp areas were inspected prior to any work by the crews.

PINE AND DISEASE SURVEY

A six-man survey crew subsequent to the eradication season, inspected a number of questionable white pine areas to secure more detailed information relative to stocking and working conditions. Parallel strips were run at 10-chain intervals. A running count of white pine along a 13.2 foot strip was tallied and in addition the presence of white pine and other species was tallied on a four milacre quadrat at the end of each chain. Working conditions were noted as light, medium and heavy depending upon the number and size of ribes and brush density. The data will supplement random inspections and will aid in properly appraising the areas for future blister rust control work.

A total of 9,020 acres were inspected at a cost of 11 cents per acre. The project was financed from regular Forest Service funds.

Extensive disease surveys were conducted in the Ramskull, East Fork Potlatch, Charlie Creek and Hog Meadows areas.

Results of the surveys are shown in the following summaries:

RAMSKULL CREEK - T. 43 N., R. 2 W., Secs. 7 and 18

Chains of survey strip	43
Number of trees examined	285
Number of trees infected	85
Percent of trees infected	29
Total number of cankers	121
Percent of infected trees with trunk cankers	55

Majority of cankers were on 1940 and 1941 wood.

EAST FORK POTLATCH CREEK - T. 40 N., R. 1 E., Sec. 4

Chains of survey strip	20
Number of trees examined	143
Number of trees infected	87
Percent of trees infected	60
Total number of cankers	139
Percent of infected trees with trunk cankers	71

Majority of cankers were on 1937, 1938 and 1939 wood.

CHARLIE CREEK - T. 43 N., R. 2 W., Secs. 10, 15, 21 and 22

Number of trees examined	135
Number of trees infected	18
Percent of trees infected	13
Total number of cankers	25
Percent of infected trees with trunk cankers	66

Majority of cankers on 1939 and 1940 wood.

HOG MEADOWS AREA - T. 40 N., R. 1 W., Sec. 2

Chains of survey strip	14
Number of trees examined	125
Number of trees infected	10
Percent of trees infected	8
Total number of cankers	10
Percent of infected trees with trunk cankers	40

Majority of cankers on 1940 wood.

Random inspections were made in Big Creek in T. 47 N., R. 3 E., and Mowat Creek in T. 46 N., R. 3 E. A very definite increase in the amount of pine infection was noted in both areas, resulting from the very favorable ribes to pine infection conditions which prevailed in 1941. A regular disease survey should be conducted on both areas in 1946 to properly appraise the percent of infection and the amount of damage that may be expected.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 19,114.34
	Regular BLR-3-4	41,556.85
	Subtotal	$ 60,671.19
State of Idaho	State BLR-3-4	$ 685.36
Potlatch Timber Protective Association	Private BLR-3-4	553.36
	Subtotal	$ 1,238.72
Forest Service	Regular BLR-4	$195,941.51
Total		$257,851.42

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
ST. JOE OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	Total
Sal. perm. men	$12,115.90			$12,115.90	$ 6,480.00	$ 18,595.90
Sal. temp. men	1,085.40	$ 9,878.76	$ 215.83	11,179.99		11,179.99
Wages, temp. labs.	3,736.30	24,802.77	1,022.89	29,561.96	144,047.13	173,609.09
Subs. supplies	307.99	5,706.13		6,014.12	27,098.78	33,112.90
Equipment	127.16	288.42		415.58	10,463.23	10,878.81
Travel & transp.	586.80	358.17		944.97	5,467.53	6,412.50
Other supplies	1,154.79	522.60		1,677.39	2,384.84	4,062.23
Total	$19,114.34	$41,556.85	$1,238.72	$61,909.91	$195,941.51	$257,851.42

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
First	Cutover	1940-44	43	32	728	.74	17
	Reproduction	1910-39	28	73	2,857	2.61	102
	Total		71	105	3,585	1.48	50
Second	Reproduction	1910-39	63	95	660	1.51	10
	Total		63	95	660	1.51	10
Third	Plantation	1940-44	242	300	12,479	1.24	52
	Cutover	1920-39	145	215	1,311	1.48	9
	Reproduction	1910-39	7,955	14,001	191,557	1.76	24
	Pole		339	303	4,098	.90	12
	Stream (3)		610	777	28,664	1.27	47
	Total		9,290	15,596	238,109	1.68	26
All Workings	Cutover	1940-44	43	32	728	.74	17
	Plantation	1940-44	242	300	12,479	1.24	52
	Cutover	1920-39	145	215	1,311	1.48	9
	Reproduction	1910-39	8,046	14,169	195,074	1.76	24
	Pole		339	303	4,098	.90	12
	Stream (4)		610	777	28,664	1.27	47
	Total		9,424	15,796	242,354	1.68	26

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(3)	273	260	529
(4)	273	260	529

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
ST. JOE OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
Idaho	First	EQ-Coop.	43	32	728		.74	17
		FS-Reg.	28	73	2,857		2.61	102
		Total	71	105	3,585		1.48	50
	Second	FS-Reg.	63	95	660		1.51	10
		Total	63	95	660		1.51	10
	Third	EQ-Coop.	3,901	4,921	70,700	529	1.26	18
		FS-Reg.	5,389	10,675	167,409		1.98	31
		Total	9,290	15,596	238,109	529	1.68	26
	All Workings	EQ-Coop.	3,944	4,953	71,428	529	1.26	18
		FS-Reg.	5,480	10,843	170,926		1.98	31
		Total	9,424	15,796	242,354	529	1.68	26

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
ST. JOE OPERATION

State	Working	Acres Worked: By Forest Service: National Forest	Public Domain	State	Private	Total	By Bureau of Entomology and Plant Quarantine: National Forest	Public Domain	State	Private	Total	Total: Federal: National Forest	Public Domain	Other: State	Private	Total	Total
Idaho	First	28				28				43	43	28			43	43	71
	Second	63				63						63					63
	Third	4,356	185	264	584	5,389	802	142	1,638	1,319	3,901	5,158	327	1,902	1,903	3,805	9,290
	Total	4,447	185	264	584	5,480	802	142	1,638	1,362	3,944	5,249	327	1,902	1,946	3,848	9,424

TABLE 6

RIBES SPECIES ERADICATED, 1945
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes Species: Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Total Ribes
First	Cutover (1940-44)	43	709		16	3	728
	Reproduction (1910-39)	28	3	2,852	2		2,857
	All Types	71	712	2,852	18	3	3,585
Second	Reproduction (1910-39)	63	65	595			660
	All Types	63	65	595			660
Third	Plantation (1940-44)	242	12	12,467			12,479
	Cutover (1920-39)	145	1,181	130			1,311
	Reproduction (1910-39)	7,955	113,220	78,098	65	174	191,557
	Pole	338	3,089	1,007	2		4,098
	Stream	610	16,245	17	10,819	1,583	28,664
	All Types	9,290	133,747	91,719	10,886	1,757	238,109
All Workings	Cutover (1940-44)	43	709		16	3	728
	Plantation (1940-44)	242	12	12,467			12,479
	Cutover (1920-39)	145	1,181	130			1,311
	Reproduction (1910-39)	8,046	113,288	81,545	67	174	195,074
	Pole	338	3,089	1,007	2		4,098
	Stream	610	16,245	17	10,819	1,583	28,664
	All Types	9,424	134,524	95,166	10,904	1,760	242,354

TABLE 7

SUMMARY OF RIBES ERADICATION, 1929 - 1945
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre: Man-Days	Per Acre: Ribes	Net Acreage Remaining: Worked	Net Acreage Remaining: Unworked
First	Cutover	1940-44	308	221	14,730	.72	48	308	31,301
	Plantation	1940-44	2,209	4,763	1,092,843	2.16	495	2,209	
	Cutover	1920-39	16,291	11,381	3,596,739	.70	221	16,291	156,962
	Reproduction	1910-39	217,601	240,012	80,756,356	1.10	371	217,601	105,093
	Pole		86,838	33,082	7,780,055	.38	90	86,838	18,516
	Mature		177,162	68,756	17,998,538	.39	102	123,837	87,848
	Miscellaneous		2,652	2,297	767,429	.87	289	2,652	
	Stream (1)		35,469	97,121	23,358,708	2.74	659	35,469	
	Total		538,530	457,633	135,365,398	.85	251	485,205	399,720
Second	Plantation	1940-44	745	638	53,382	.86	72	745	
	Cutover	1920-39	7,046	7,502	524,246	1.06	74	7,046	
	Reproduction	1910-39	78,500	93,573	9,076,096	1.19	116	78,500	
	Pole		36,848	21,735	1,318,108	.59	36	36,848	
	Mature		8,965	6,831	821,719	.76	92	8,055	
	Miscellaneous		431	43	2,567	.10	6	431	
	Stream (2)		12,638	27,514	5,191,492	2.18	411	12,638	
	Total		145,173	157,836	16,987,610	1.09	117	144,263	
Third	Plantation	1940-44	242	300	12,479	1.24	52	242	
	Cutover	1920-39	205	290	2,088	1.41	10	205	
	Reproduction	1910-39	21,514	37,443	876,887	1.74	41	21,514	
	Pole		4,625	2,905	74,092	.63	16	4,625	
	Mature		170	325	38,042	1.91	224	170	
	Stream (3)		7,704	13,314	1,705,923	1.73	221	7,704	
	Total		34,460	54,577	2,709,511	1.58	79	34,460	
All Workings	Cutover	1940-44	308	221	14,730	.72	48	308	
	Plantation	1940-44	3,196	5,701	1,158,704	1.78	363	3,196	
	Cutover	1920-39	23,542	19,173	4,123,073	.81	175	23,542	
	Reproduction	1910-39	317,615	371,028	90,709,339	1.17	286	317,615	
	Pole		128,311	57,722	9,172,255	.45	71	128,311	
	Mature		186,297	75,912	18,858,299	.41	101	132,062	
	Miscellaneous		3,083	2,340	769,996	.76	250	3,083	
	Stream (4)		55,811	137,949	30,256,123	2.47	542	55,811	
	Total		718,163	670,046	155,062,519	.93	216	663,928	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	7,404	21,683	669,706
(2)	3,245	4,731	111,663
(3)	1,341	1,104	20,347
(4)	11,990	27,518	801,716

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929 - 1945
ST. JOE OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
Idaho	EQ-Coop.	37,544	32,759	4,659,669	60,114	.87	124
	EQ-Emerg.	234,519	157,898	43,593,387	77,088	.67	186
	FS-Reg.	182,877	208,906	34,586,054	314,332	1.14	189
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216
	CCC	192,242	225,345	56,890,303	248,706	1.17	296
	Total	718,163	670,046	155,062,519	801,716	.93	216

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929 - 1945
ST. JOE OPERATION

State	Ownership	Net Acres in Control Area: Acres Worked: First	Second	Third	Total	Acres Unworked	Total Acres
Idaho	National Forest	215,404	76,979	19,961	312,344	96,804	312,208
	Public Domain	12,458	5,159	1,354	18,971	12,007	24,465
	Subtotal Federal	227,862	82,138	21,315	331,315	108,811	336,673
	State	57,898	19,213	3,553	80,664	57,171	115,069
	Private	199,445	42,912	9,592	251,949	233,738	433,183
	Subtotal Other	257,343	62,125	13,145	332,613	290,909	548,252
	Total	485,205	144,263	34,460	663,928	399,720	884,925

TABLE 10

RIBES SPECIES ERADICATED, 1929 - 1945
ST. JOE OPERATION

Working	Eradication Type	Gross Acres	Ribes Species: Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	Total Ribes
First	Cutover (1940-44)	308	11,017	3,694	16	3			14,730
	Plantation (1940-44)	2,209	158,749	933,486	161		447		1,092,843
	Cutover (1920-39)	16,291	1,132,425	2,452,653	8,329	2,120	1,212		3,596,739
	Reproduction (1910-39)	217,601	15,368,279	64,766,368	122,682	344,709	154,318		80,756,356
	Pole	86,838	3,234,919	4,383,484	21,170	63,499	76,933		7,780,055
	Mature	177,162	9,757,096	7,918,594	26,516	40,599	255,733		17,998,538
	Miscellaneous	2,652	148,445	615,565	1,987	1,432			767,429
	Stream	35,469	16,372,384	888,029	3,331,826	2,749,642	16,695	132	23,358,708
	All Types	538,530	46,183,314	81,961,873	3,512,687	3,202,004	505,388	132	135,365,398
Second	Plantation (1940-44)	745	8,165	45,217					53,382
	Cutover (1920-39)	7,046	285,707	227,775	1,765	2,781	6,218		524,246
	Reproduction (1910-39)	78,500	3,443,546	5,532,523	32,750	62,364	4,913		9,076,096
	Pole	36,848	572,299	721,515	5,807	18,483	4		1,318,108
	Mature	8,965	353,412	436,466		19	31,822		821,719
	Miscellaneous	431	456	2,111					2,567
	Stream	12,638	3,045,535	163,110	1,081,834	753,469	6,073	141,471	5,191,492
	All Types	145,173	7,709,120	7,128,717	1,122,156	837,116	49,030	141,471	16,987,610
Third	Plantation (1940-44)	242	12	12,467					12,479
	Cutover (1920-39)	205	1,847	241					2,088
	Reproduction (1910-39)	21,514	419,536	441,442	8,651	7,258			876,887
	Pole	4,625	52,714	21,190	44	144			74,092
	Mature	170	32,990	3,316	8		1,728		38,042
	Stream	7,704	809,515	23,061	498,873	372,092		2,382	1,705,923
	All Types	34,460	1,316,614	501,717	507,576	379,494	1,728	2,382	2,709,511
All Workings	Cutover (1940-44)	308	11,017	3,694	16	3			14,730
	Plantation (1940-44)	3,196	166,926	991,170	161		447		1,158,704
	Cutover (1920-39)	23,542	1,419,979	2,680,669	10,094	4,901	7,430		4,123,073
	Reproduction (1910-39)	317,615	19,231,361	70,740,333	164,083	414,331	159,231		90,709,339
	Pole	128,311	3,859,932	5,126,189	27,021	82,126	76,987		9,172,255
	Mature	186,297	10,143,498	8,358,376	26,524	40,618	289,283		18,858,299
	Miscellaneous	3,083	148,901	617,676	1,987	1,432			769,996
	Stream	55,811	20,227,434	1,074,200	4,912,533	3,875,203	22,768	143,985	30,256,123
	All Types	718,163	55,209,048	89,592,307	5,142,419	4,418,614	556,146	143,985	155,062,519

BLISTER RUST CONTROL WORK, COEUR D'ALENE OPERATION, 1945

By

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C. J. Pederson, Forester, U. S. Forest Service

INTRODUCTION

The 1945 blister rust control program on the Coeur d'Alene National Forest was initiated on April 27, when Mexican Nationals started working near the mouth of Steamboat Creek. On May 3, another group of Mexican Nationals commenced work on Lost Creek. During the spring program a maximum of 75 Mexican Nationals were used on blister rust control. This included pruning work near the mouth of Steamboat Creek and the early season burning of 60 acres of brush area on Scott Creek. The first student camp was occupied on May 22. The last Mexican Nationals left on September 21. During the approximate period of May 20 to July 12 there were no Mexicans engaged on blister rust control work on the forest. Nine camp locations were occupied, eight on roads and one pack camp, and all work was financed by regular Forest Service appropriations. The following summary shows accomplishments on blister rust field work performed by the different classes of labor:

Labor	Number Workers	Ribes Eradication Acres	Ribes Eradication Man-Days	Ribes Eradication Ribes	Canker Elimination Trees Treated	Canker Elimination Man-Days
Student	165	2,796	4,745	163,387		
Mexican National	225	2,306	4,996	217,971	54,997	248

Total acreage worked consisted of 1,208 acres of first working, 1,937 of second and 1,957 of third working.

A number of factors contributed toward making the past season disappointing. As in the last few years, there was not sufficient experienced overhead for all camps. Four of the camp foremen were inexperienced in that capacity and it was not possible to secure sufficient experienced assistance for them. Comparatively few experienced workers returned. The Mexican program was not as productive as had been anticipated because of a late spring and unusually inclement weather at the beginning of the season, the poor quality of the workers and a lack of sufficient experienced overhead. Mexican Nationals were not capable of adjusting themselves to changes in working conditions or methods and constituted a continuous administrative problem. As was the case in 1944, fire fighting interfered materially with the orderly progress of the work. A total of 4,838 man-days was spent by blister rust crews in fighting fires. Some camps were just reaching their productive peak when called on fire and were never able to reach maximum production afterward. In one camp 45 workers left in a group upon returning from 20 days spent on fire. However, satisfactory accomplishments were attained in the camps where it was possible to have competent overhead and where there was comparatively little interruption because of fire.

The Forest Service was responsible for the administration and maintenance of the camps and technical supervision was provided by the Bureau of Entomology and Plant Quarantine.

LOCATION AND DESCRIPTION OF AREAS

Ribes eradication efforts were confined to the protection of plantations and natural reproduction areas with the exception of a pole stand on Burnt Cabin Creek where one more fast working was needed to place the area on a maintenance basis.

1. Steamboat. Area located in secs. 23 and 24, T. 50 N., R. 2 E. This camp was occupied by Mexican Nationals on April 3. Blister rust control work was started on April 27 and continued until the camp closed on May 26. Ribes eradication consisted of first working in a mixed pole and reproduction stand near the mouths of Scott and Steamboat Creeks. Infection is very heavy here, as is evidenced by the fact that on 26 acres where pruning work was done there were 7,402 trees removed out of 7,854 trees treated. Not only were a majority of the ribes removed but the pruning job saved many trees on the area and materially reduced the production of spores which would menace the pole stand on the opposite side of the Coeur d'Alene River. As an experiment a 60-acre area of heavy brush and ribes was burned on May 7 after a fire line had been constructed by means of a bulldozer. While a good flash burn was secured it is probable that the soil was so wet that stored seed was not destroyed and that the large Ribes viscosissimum were only burned off at the top of the ground.

2. Lost Creek. The area is located in secs. 9 and 10, T. 50 N., R. 4 E. Ribes eradication work was done by Mexican Nationals from the Shoshone Creek camp in the reproduction stand at the mouth of Lost Creek starting on May 3 and closing on May 26. Second and third working was performed but because not all ribes were in leaf and the terrain was too steep for the type of labor used the work was not entirely satisfactory.

3. Lone Cabin. This area is located in secs. 23, 24, 25 and 26, T. 51 N., R. 2 W., and secs. 28 and 33, T. 51 N., R. 1 W. The camp was established on June 4 and closed September 21 and was occupied by student labor until August 14 after which time the crew was composed of Mexican Nationals. Second and third working was performed in natural reproduction stands on Lone Cabin and Sands Creeks. Because of interruptions for fire fighting and the loss of most of the original crew upon returning from fire the work planned was not completed. This should be the first priority area for 1946. Infection is heavy in Lone Cabin but it is felt that with a good ribes eradication job, augmented by pruning of infected trees and the removal of those with trunk cankers, sufficient trees can be saved to insure a satisfactory stand of white pine.

As many men as could be equipped started pruning work on August 21 and continued as long as weather permitted. This resulted in the pruning of 47,143 trees of which 10,787 were infected.

4. Bottom Creek. The area is located in secs. 13, 14, 15, 22, 23 and 24, T. 51 N., R. 2 W. Camp was established on July 12 and closed on September 21 and was manned entirely by Mexican Nationals. Ribes eradication consisted of third working in natural reproduction following logging, pole and a small

amount of mature type in the protection zone. The assigned area was not completed since this crew was used on fire fighting more than any other blister rust crew. On a calendar day basis this crew spent only 55 percent of the total available time on blister rust work. The work area connected with that worked in 1944 and continued up Burnt Cabin Creek. The pole stand is now considered on a maintenance basis but some additional work will be necessary in portions of the reproduction stand. Pine infection is present in the younger age class and the work in this drainage should be continued in 1946.

5. Hudlow. This crew worked in secs. 19, 30 and 31, T. 52 N., R. 1 W., secs. 35 and 36, T. 52 N., R. 2 W., and secs. 1 and 2, T. 51 N., R. 2 W. Blister rust work was started on June 13 and closed on September 21. The original blister rust crew consisted of student labor and on July 23 Mexican Nationals were also located there.

Ribes eradication work was performed in the white pine plantation on Nicholas Creek, stream type on Hudlow Creek and plantation and natural reproduction on East Fork Hudlow. The plantation area on Nicholas Creek was completed although additional work is needed in the protection zone on the west side. Additional work is also needed on Hudlow Creek and on the East Fork of Hudlow where time did not permit the necessary mop-up. Infection conditions are not serious in any of the areas worked by this crew.

6. Trail Creek. The worked area is located in secs. 15 and 22, T. 52 N., R. 1 E., and consisted primarily of stream type along Trail Creek above the mouth of Hamilton Creek. Mexican Nationals occupied this camp on July 16 and the camp was closed on August 13 when the crew was moved to Lone Cabin and Nowhere camps in order to use the men on areas of higher priority. While this camp was occupied, 56 percent of the available time was spent in fire fighting.

7. Bear Creek. Work was performed in secs. 13 and 24, T. 52 N., R. 1 E., and the camp was occupied on July 21 and closed on August 30 when the crew was moved to higher priority areas which were in more urgent need of work. Ribes eradication consisted entirely of first working in stream type and was performed by Mexican Nationals. An attempt to use an entire Mexican crew here, including overhead and cooks, was not very satisfactory. While there is not much infection in this area the natural white pine reproduction should be given first working soon.

8. Owl Creek. Worked area is located in secs. 30 and 31, T. 53 N., R. 2 E., sec. 36, T. 53 N., R. 1 E., sec. 1, T. 52 N., R. 1 E., sec. 6 T. 52 N., R. 2 E. The camp was established on July 17 and closed on September 21. It was the only pack camp on the operation. Ribes eradication consisted of third working in plantation and was an extension of area worked in 1944. The camp was manned by Mexican Nationals and was the only crew which was not called upon to fight fire. Because of good supervision, this crew came nearer meeting expectations than any of the other Mexican National crews. A very large percentage of the area worked can be placed on a maintenance basis.

9. Nowhere. Area worked this season is located in secs. 7, 8, 17, 18, 19 and 20, T. 52 N., R. 3 E., and secs. 13, 23 and 24, T. 52 N., R. 2 E. The camp was first occupied by student labor on May 22 and closed on September 14. Mexican Nationals were added to the crew from other camps to insure completing the assigned area. First, second and third workings were done to complete work started in 1944 on the Senator Creek plantation area, on the Brett Creek area which was planted in the spring of 1945 and the natural reproduction area along the river adjacent to the plantings. Very satisfactory work was performed by the student labor in this camp, resulting in a goodly portion of the plantation areas being placed on maintenance. This was the only camp which reached its acreage quota, due principally to the fact that only 150 man-days were spent on fire.

Generally speaking, the plantation areas worked from Nowhere, Owl and Hudlow camps and the pole stand along Burnt Cabin Creek represented fairly good working conditions. Stream type on Bear Creek and along the Coeur d'Alene River was rather severe. Reproduction stands on Lone Cabin and Burnt Cabin Creeks represented difficult working conditions because of the many small ribes present and poor visibility conditions.

All areas worked in 1945 are in Federal ownership.

WORKING METHODS

The use of Mexican Nationals necessitated many variations of working methods ranging from the gang formation to individual 3-man crews in adjoining lanes. Working methods used depended upon the number of assistant foremen and straw bosses available. Mexican crews could not work in very wide strips regardless of working conditions. Because of the type of labor, plus interruptions for fire fighting, it was necessary to carry on a continuous training program. With student labor it was possible in some cases to use individual 3-man crews. All workers were given training in the proper use of common woods tools before any ribes eradication work was undertaken. All string lines were laid in advance by specially trained crews. The practice of the camp foreman interviewing each worker immediately upon his arrival in camp continued with the student labor.

CHECKING AND SURVEYS

A checker foreman and one experienced checker were available at the start of the season but others, some of whom had previous blister rust experience, were trained for the work and at one time there were eight checkers employed although only four remained throughout the ribes eradication season.

Regular check was performed on practically all of the area worked this season. The only exceptions were areas where it was evident from the large number of ribes removed that additional working would be necessary; areas worked late in the season when a satisfactory check could not be obtained, and a few areas where needed mop-up was not accomplished. Regular check shows that satisfactory work was accomplished on plantation areas and in pole and mature stands. Some of the natural reproduction areas will need further work due to difficult working conditions and small bushes occurring where visibility is very poor.

Advance survey was conducted on Bear Creek and the prepared maps will be of assistance in planning the work on this area at some future time.

Only a small amount of disease survey was conducted during the season because all checkers were needed for regular check. When other qualified men became available the lateness of the season necessitated confining efforts to highest priority areas on the North Fork of the Coeur d'Alene River where blister rust infection is probably more severe than on any other area of comparable size on the forest. Areas were selected which would give the best general picture of infection conditions. Because of a lack of time, the work was speeded up by running strips ten chains apart and by taking data on strips one-half rod wide. It was felt that this would give a sufficiently accurate picture and more area could be sampled. The results of this survey are summarized as follows:

Area	Miles Strip	Trees Examined	Trees Infected	Percent Infection
Honey Creek Burn, secs. 31, 32, T. 53 N., R. 1 W., sec. 36, T. 53 N., R. 2 W., secs. 5, 6, T. 52 N., R. 1 W.	2.5	1,124	16	1.4
Frog Creek, secs. 5, 6, 8, T. 52 N., R. 1 W.	1.8	971	73	7.5
Tom Lavin, secs. 7, 12, 17, 18, T. 52 N., R. 1 W.	3.1	1,877	133	7.1
Solitaire Burns, secs. 9, 16, 17, T. 52 N., R. 1 W.	3.2	1,539	143	9.3
Lewelling Creek, secs. 18, 19, 20, T. 52 N., R. 1 W.	2.0	978	137	14.0
Squirrel Creek, secs. 19, 20, T. 52 N., R. 1 W.	.4	119	20	16.8
Iron Creek, secs. 21, 22, 27, 28, T. 52 N., R. 1 W.	4.9	1,135	116	10.2
Middle Fork Hudlow, sec. 24, T. 52 N., R. 2 W.	.8	420	29	6.9
Bottom Creek, secs. 11, 12, 13, 14, T. 51 N., R. 2 W.	2.3	2,274	140	6.2
Lone Cabin, secs. 19, 30, T. 51 N., R. 1 W.	3.7	1,898	258	13.6

These areas are either plantations or very good stands of natural reproduction. The Honey Creek Burn was worked last in 1944 and from the amount of infection present is apparently in a safe condition for a number of years. Frog Creek, Tom Lavin and Lewelling were worked last in 1942 or prior thereto, and those portions containing ribes should be worked during the next season to prevent a build-up of infection. Squirrel Creek was used as a training area this season and mop-up work should be done there in 1946. The data for Iron Creek represent samples of plantings on Moose Creek, Cataract and Rablens Fork. These areas have not been worked since planting and need immediate attention. The Middle Fork Hudlow area supports a mixture of plantation and natural reproduction and work was performed here in 1945 but no infection data were available. The Bottom Creek area is natural reproduction following logging and extends from the mouth to the dense pole stand. The portion of Lone Cabin surveyed is downstream from this year's work and extends to Burnt Cabin Creek. Both of these areas should be worked in 1946.

Very little time was spent in continuing the area classification work started in 1943 because of the late closing of the eradication season and a lack of qualified personnel. However, some work was done in the vicinity of Deer Creek and Beaver Lookout, the East Fork in the vicinity of Larch Mountain, Beaver Creek near Prichard and in Hayden, Mokins, Yellowbanks, Phantom and Stella Creeks. Uranus Creek was also examined and it was decided to place that portion from which white pine had been removed on a deferred basis.

CONTROL STATUS

Since the area classification work is not completed and because the post check program is very much behind schedule, any control status figures which would apply to the entire operation are subject to continual change. Ribes eradication work performed during the 1945 field season resulted in approximately 3,692 acres of that work being classed as on a maintenance basis, 282 acres needing post check and 1,128 acres needing rework. No appreciable amount of post check survey was conducted.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 3,243.57
Forest Service	Regular BLR-4	200,854.15
Total		$204,097.72

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine Regular BLR-1-4	Forest Service Regular BLR-4	Total
Sal. perm. men	$3,088.01	$ 5,098.65	$ 8,186.66
Sal. temp. men		9,461.12	9,461.12
Wages, temp. labs.		135,792.63	135,792.63
Subs. supplies		36,785.29	36,785.29
Equipment		2,757.22	2,757.22
Travel and transp.	152.12	3,010.42	3,162.54
Other supplies	3.44	7,948.82	7,952.26
Total	$3,243.57	$ 200,854.15	$204,097.72

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
First	Plantation	1945-49	715	403	9,547	.56	13
	Plantation	1940-44	205	260	34,187	1.27	167
	Reproduction	1910-39	207	505	21,714	2.44	105
	Miscellaneous		21	40	4,667	1.90	222
	Stream		60	481	45,326	8.02	755
	Total		1,208	1,689	115,441	1.40	96
Second	Plantation	1940-44	255	753	28,382	2.95	111
	Cutover	1920-39	152	531	22,901	3.49	151
	Reproduction	1910-39	1,000	2,043	83,011	2.04	83
	Mature		155	483	14,968	3.12	97
	Miscellaneous		203	203	4,587	1.00	23
	Stream		172	638	22,253	3.71	29
	Total		1,937	4,651	176,102	2.40	91
Third	Cutover	1920-39	326	1,172	30,370	3.60	93
	Reproduction	1910-39	1,102	1,409	42,932	1.28	39
	Pole		267	182	1,532	.68	6
	Mature		169	164	4,162	.97	25
	Stream		93	474	10,819	5.10	116
	Total		1,957	3,401	89,815	1.74	46
All Workings	Plantation	1945-49	715	403	9,547	.56	13
	Plantation	1940-44	460	1,013	62,569	2.20	136
	Cutover	1920-39	478	1,703	53,271	3.56	111
	Reproduction	1910-39	2,309	3,957	147,657	1.71	64
	Pole		267	182	1,532	.68	6
	Mature		324	647	19,130	2.00	59
	Miscellaneous		224	243	9,254	1.08	41
	Stream		325	1,593	78,398	4.90	241
	Total		5,102	9,741	381,358	1.91	75

TABLE 4

RIBES SPECIES ERADICATED, 1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes Species: Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Total Ribes
First	Plantation (1945-49)	715	6,130	3,398		19	9,547
	Plantation (1940-44)	205	6,221	27,966			34,187
	Reproduction (1910-39)	207	2,887	18,827			21,714
	Miscellaneous	21	456	4,211			4,667
	Stream	60	19,831	12	25,483		45,326
	All Types	1,208	35,525	54,414	25,483	19	115,441
Second	Plantation (1940-44)	255	28,281	101			28,382
	Cutover (1920-39)	152	21,381	1,520			22,901
	Reproduction (1910-39)	1,000	68,744	13,373		894	83,011
	Mature	155	12,825	2,143			14,968
	Miscellaneous	203	1,925	2,662			4,587
	Stream	172	20,939	1,314			22,253
	All Types	1,937	154,095	21,113		894	176,102
Third	Cutover (1920-39)	326	29,783	587			30,370
	Reproduction (1910-39)	1,102	35,812	5,921		1,199	42,932
	Pole	267	1,532				1,532
	Mature	169	3,326	836			4,162
	Stream	93	10,808	11			10,819
	All Types	1,957	81,261	7,355		1,199	89,815
All Workings	Plantation (1945-49)	715	6,130	3,398		19	9,547
	Plantation (1940-44)	460	34,502	28,067			62,569
	Cutover (1920-39)	478	51,164	2,107			53,271
	Reproduction (1910-39)	2,309	107,443	38,121		2,093	147,657
	Pole	267	1,532				1,532
	Mature	324	16,151	2,979			19,130
	Miscellaneous	224	2,381	6,873			9,254
	Stream	325	51,578	1,337	25,483		78,398
	All Types	5,102	270,881	82,882	25,483	2,112	381,358

TABLE 5

SUMMARY OF RIBES ERADICATION, 1927 - 1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-49	715	403	9,547	.56	13	715	
	Cutover	1940-44							9,568*
	Burn	1940-44	716	351	53,652	.49	75	716	246
	Plantation	1940-44	992	1,920	465,201	1.94	469	992	227
	Cutover	1920-39	16,231	21,084	5,314,713	1.30	327	16,231	19,378
	Reproduction	1910-39	89,696	139,112	20,700,143	1.55	231	87,873	10,813
	Pole		65,866	31,254	4,479,922	.47	68	65,130	9,565
	Mature		141,096	87,729	13,798,358	.62	98	123,079	7,390
	Miscellaneous		13,333	16,695	2,965,945	1.25	222	12,909	304
	Stream		14,868	57,706	11,815,944	3.88	795	14,760	2,655
	Total		343,513	356,254	59,603,425	1.04	174	322,405	60,146
Second	Plantation	1940-44	618	1,529	130,960	2.47	212	618	
	Cutover	1920-39	8,938	12,768	1,924,931	1.43	215	8,938	
	Reproduction	1910-39	17,287	28,904	1,824,836	1.67	106	16,554	
	Pole		4,816	3,093	485,788	.64	101	4,816	
	Mature		10,118	8,071	810,766	.80	80	9,818	
	Miscellaneous		1,585	2,963	358,052	1.87	226	1,585	
	Stream		7,787	14,193	1,560,951	1.82	200	7,679	
	Total		51,149	71,521	7,096,284	1.40	139	50,008	
Third	Plantation	1940-44	513	919	51,175	1.79	100	513	
	Cutover	1920-39	3,246	6,064	293,587	1.87	90	3,246	
	Reproduction	1910-39	3,523	5,892	231,989	1.67	66	2,916	
	Pole		749	679	52,144	.91	70	749	
	Mature		1,713	1,236	70,610	.72	41	1,713	
	Miscellaneous		13	11	1,424	.85	110	13	
	Stream		1,465	2,614	131,981	1.78	90	1,465	
	Total		11,222	17,415	832,910	1.55	74	10,615	
All Workings	Plantation	1945-49	715	403	9,547	.56	13	715	
	Burn	1940-44	716	351	53,652	.49	75	716	
	Plantation	1940-44	2,123	4,368	647,336	2.06	305	2,123	
	Cutover	1920-39	28,415	39,916	7,533,231	1.40	265	28,415	
	Reproduction	1910-39	110,506	173,908	22,756,968	1.57	206	107,343	
	Pole		71,431	35,026	5,017,854	.49	70	70,695	
	Mature		152,927	97,036	14,679,734	.63	96	134,610	
	Miscellaneous		14,931	19,669	3,325,421	1.32	223	14,507	
	Stream		24,120	74,513	13,508,876	3.09	560	23,904	
	Total		405,884	445,190	67,532,619	1.10	166	383,028	

*Includes 1,920 acres cut over in 1945

TABLE 6

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1945
COEUR D'ALENE OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Per Acre	
					Man-Days	Ribes
Idaho	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	EQ-Emerg.	41,039	35,541	6,589,217	.87	161
	FS-Reg.	79,087	94,399	14,331,387	1.19	181
	FS-Emerg.	111,711	86,897	17,620,173	.78	158
	CCC	148,271	220,002	26,145,459	1.48	176
	Total	405,884	445,190	67,532,619	1.10	166

TABLE 7

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1945
COEUR D'ALENE OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	306,261	47,764	10,486	364,511	53,195	359,456
	State	5,427	440	45	5,912	711	6,138
	Private	10,717	1,804	84	12,605	6,240	16,957
	Subtotal Other	16,144	2,244	129	18,517	6,951	23,095
	Total	322,405	50,008	10,615	383,028	60,146	382,551

TABLE 8

RIBES SPECIES ERADICATED, 1927-1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Gross Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Plantation (1945-49)	715	6,130	3,398			19	9,547
	Burn (1940-44)	716	47,019	6,633				53,652
	Plantation (1940-44)	992	331,135	134,066				465,201
	Cutover (1920-39)	16,231	3,806,948	1,462,643	1	17,536	27,585	5,314,713
	Reproduction (1910-39)	89,696	12,167,831	7,900,866	2,227	526,767	102,452	20,700,143
	Pole	65,866	2,612,374	1,799,139	12,246	12,823	43,340	4,479,922
	Mature	141,096	10,712,514	2,845,919	1	89,402	150,522	13,798,358
	Miscellaneous	13,333	1,294,530	1,630,684		31,121	9,610	2,965,945
	Stream	14,868	7,271,186	183,273	31,474	4,261,624	68,387	11,815,944
	All Types	343,513	38,249,667	15,966,621	45,949	4,939,273	401,915	59,603,425
Second	Plantation (1940-44)	618	114,950	16,010				130,960
	Cutover (1920-39)	8,938	1,582,771	325,474		13,606	3,080	1,924,931
	Reproduction (1910-39)	17,287	1,003,936	797,942		13,229	9,729	1,824,836
	Pole	4,816	364,939	111,666	4,736	3,882	565	485,788
	Mature	10,118	524,226	271,114		11,089	4,337	810,766
	Miscellaneous	1,585	165,803	192,249				358,052
	Stream	7,787	1,089,378	45,072		420,500	6,001	1,560,951
	All Types	51,149	4,846,003	1,759,527	4,736	462,306	23,712	7,096,284
Third	Plantation (1940-44)	513	46,607	4,568				51,175
	Cutover (1920-39)	3,246	255,559	38,028				293,587
	Reproduction (1910-39)	3,523	153,994	75,131		1,648	1,216	231,989
	Pole	749	41,954	10,190				52,144
	Mature	1,713	67,497	3,113				70,610
	Miscellaneous	13	129	1,295				1,424
	Stream	1,465	93,982	213		37,778	8	131,981
	All Types	11,222	659,722	132,538		39,426	1,224	832,910
All Workings	Plantation (1945-49)	715	6,130	3,398			19	9,547
	Burn (1940-44)	716	47,019	6,633				53,652
	Plantation (1940-44)	2,123	492,692	154,644				647,336
	Cutover (1920-39)	28,415	5,645,278	1,826,145	1	31,142	30,665	7,533,231
	Reproduction (1910-39)	110,506	13,325,761	8,773,939	2,227	541,644	113,397	22,756,968
	Pole	71,431	3,019,267	1,920,995	16,982	16,705	43,905	5,017,854
	Mature	152,927	11,304,237	3,120,146	1	100,491	154,859	14,679,734
	Miscellaneous	14,931	1,460,462	1,824,228		31,121	9,610	3,325,421
	Stream	24,120	8,454,546	228,558	31,474	4,719,902	74,396	13,508,876
	All Types	405,884	43,755,392	17,858,686	50,685	5,441,005	426,851	67,532,619

BLISTER RUST CONTROL WORK, KANIKSU OPERATION, 1945

By

H. A. Brischle, Operation Supervisor
L. J. Easley, Assistant Operation Supervisor
G. M. Houghton, Checker Foreman-Forest Service

Within the boundaries of the Kaniksu blister rust control project are the valuable white pine areas administered by the Kaniksu National Forest, the Priest Lake Timber Protective Association as well as areas of state and private ownership. These areas are located in Bonner and Boundary Counties in Northern Idaho and Pend Oreille County in Northeastern Washington.

The 1945 work program consisted of four camps financed from Forest Service regular funds varying in size from 30 to 45 boys, 3 internee camps from 35 to 65 men each. A camp of Mexican Nationals was used in the early spring and again in late summer. There were also two Bureau cooperative camps of 45 boys each located on State of Idaho lands and financed by state and private funds and federal funds made available under the Lea Act.

As in the past several seasons the teen-age crews were made up of boys 16 to 18 years of age. Mexican Nationals were secured through the War Food Administration. They were used during the early spring until the latter part of May at which time they were released for farm work. They were secured again about the middle of July and kept until September 30. The German Internees were secured through the Immigration and Naturalization Service of the Department of Justice. They arrived on the project early in May and were kept until August 16, 1945, at which time they were returned to the internment camp for repatriation or release.

As in the past it was difficult to obtain enough qualified and experienced overhead to adequately supervise all the crews. However, there was a larger nucleus of experienced workers than in 1944. This factor, together with experience gained in training and supervising teen-age workers the past several years, resulted in considerable improvement in the quality and quantity of work as well as a reduction in turnover.

Heavy late snow and a late spring greatly hampered early field work. The first ribes eradication was done with Mexican crews on May 3. The first German camp was established near Ione, Washington on May 7. The first crew of boys arrived on May 22. Good weather conditions prevailed after May 20 and throughout the remainder of the season very little time was lost due to rain. The blister rust season was somewhat shortened for the boys in the Forest Service camps by the occurrence of several fires about the middle of August. Many boys failed to return to their respective camps for blister rust work after being released from these fires. A total of 618 man-days were spent on fire suppression by the boy crews, 709 man-days by the German Internees and 573 man-days by the Mexicans.

A group of 45 Mexicans worked on ribes eradication throughout the month of September. All other camps were closed by September 1. During the season a

total of 20,095 acres were worked by all camps including 5,363 acres of initial and 14,732 acres of second and third working. The following accomplishments were made by the different classes of labor:

Labor	Number Workers	Ribes Eradication Acres	Man-Days	Ribes	Canker Elimination Trees Treated	Man-Days
Student	238	10,559	9,146	905,452		
Mexican National	66	2,238	2,616	314,773	55,000	338
German Internees	153	7,298	4,817	854,218		
Total	457	20,095	16,579	2,074,443	55,000	338

Most of the work was done on the younger stands which are increasing rapidly as a result of heavy cutting of mature stands. The year 1945 did not appear to be a favorable one for the spread of the rust. Disease surveys made during the year indicate that only a small amount of new infection has occurred since the last serious spread in 1941.

ORGANIZATION AND ADMINISTRATION

Blister rust headquarters on Kalispell Bay served as the operation headquarters for both Forest Service and Bureau camps. The clerical work necessary for the ordering and handling of supplies, equipment, preparation of pay rolls, property records, etc., was under the supervision of Harry S. Peters who was assisted with the warehousing by one Forest Service employee and one German internee. Deliveries were made to nine camps by truck. One isolated camp was serviced by pack stock and one by boat. The organization was as follows:

H. A. Brischle, Operation Supervisor
L. J. Easley, Assistant Operation Supervisor
G. M. Houghton, In Charge of Checking
H. S. Peters, Assistant to Operation Supervisor in Charge Operation Headquarters

The above officers supervised and administered both the Forest Service and Bureau of Entomology and Plant Quarantine Camps.

Program	Number Camps	Number Workers	Number Checkers
FS-Regular	4	144	3
FS-Regular Internee	3	151	2
FS-Regular Mexican	1	66	1
EQ-Cooperative	2	88	2

Total men employed at peak of season - 457 (July 15)

DESCRIPTION OF AREAS AND LOCATION OF WORK

Bureau Cooperative Camps

Camp 401	Township	Range	Sections in Which Work was Performed
Big Creek	57N	3W	6, 7, 8, 9, 17, 18
	57N	4W	12, 13

This camp was opened on June 1 and closed August 25. A total of 2,262 acres were worked. On 72 acres of first working 364 ribes per acre were removed, 72 acres of second working had 213 ribes per acre, and 2,118 acres of third working had 36 ribes per acre. The entire area was worked at the rate of .84 man-days per acre. The check indicates that on the portions of the area that have been worked three times, the ribes have been reduced to 3 bushes and 5 feet of live stem per acre. Logging operations were completed on this area in 1934. Numerous suppressed ribes, missed on previous workings, have been a difficult problem. In favorable growing seasons these bushes, after retaining seedling size for several years, put on appreciable growth. It is planned to post check the area in two or three years to determine the control status.

Camp 402	Township	Range	Sections in Which Work was Performed
Caribou Creek	62N	4W	3
	63N	4W	25, 26, 27, 34, 35, 36

This camp was opened on June 1 and closed on August 25. A total of 1,664 acres were worked all of which were second work. The area is in a 1926 burn and the white pine going from the reproduction to the pole stage. Twenty-one ribes per acre were removed at the rate of .96 man-days per acre. The final check shows 3 ribes with 3 feet of live stem per acre remaining.

The ribes on this area appear to be well stabilized. It is planned to post check the area in two or three years to determine the effectiveness of control.

Forest Service Camps (Regular)

Camp 400	Township	Range	Sections in Which Work was Performed
Kalispell Bay	35N	45E	13
	35N	46E	18
	36N	45E	34, 35
	59N	4W	6
	59N	5W	4, 5, 10, 11, 12, 13
	60N	4W	31
	60N	5W	2, 9, 22, 26, 27, 29, 30, 32

This camp was opened on June 4, and was closed on August 25. From a work standpoint the camp was non-effective after August 18, when the boys were engaged in fire suppression through the remainder of August.

This crew operated out of Kalispell Bay headquarters, being hauled to work by trucks. The work was done on widely separated areas within a 15-mile radius from camp. By operating this project in conjunction with blister rust headquarters it eliminated the establishment of a separate camp and materially cut down the expense of maintaining headquarter facilities. The areas worked by the crews were stream type in the Binarch Creek pole stands, cut-over areas in Lamb Creek, Lamb Creek stream type and a portion of the Lamb Creek plantation.

A total of 1,432 acres were worked of which 636 were first, 762 second and 34 acres were third work. On first working 155 ribes were removed per acre, 41 per acre on second and 33 on third working. Ninety ribes per acre were removed at the rate of .89 man-days per acre.

Camp 451	Township	Range	Sections in Which Work was Performed
Boswell	33N	45E	1, 2, 12, 13
	33N	46E	6, 18
	34N	45E	27, 28, 33, 34, 35
	57N	5W	5, 6

This camp was made up of German Internees, which were carried over from a winter snagging and hazard reduction project. The camp started ribes eradication work on May 15. They spent 312 man-days on fire suppression. The camp was closed on August 16 when they were returned to the internment camp.

This camp worked 1,491 acres in recent cut-over and the 1938 Goose Creek Burn. Two hundred and sixty-four ribes per acre were removed at the rate of 1.17 man-days per acre.

During the winter of 1944-45, this camp snagged that portion of the Goose Creek Burn above the road, an area of 225 acres. On September 12 the area was control burned. A good clean burn resulted destroying many large ribes and leaving the area in good shape for planting.

Camp 452	Township	Range	Sections in Which Work was Performed
Diamond Creek	36N	45E	1, 2, 11, 12
	36N	46E	6, 7

This camp was started with German Internees May 20. By July a number of the internees had been paroled leaving too small a group for efficient operation. Accordingly they were redistributed among the other internee camps and the camp was filled with boys. The combined crews worked 801 acres and pulled 708 ribes per acre; 644 acres were first work and 157 acres second work. The area was covered at the rate of 1.39 man-days per acre. Most of the area was originally burned in 1926. The area came back to heavy ribes and was heavily infected by 1940 at which time it was snagged by a CCC crew. It was control burned in 1942. A hard clean burn was obtained over most of the area. A part of the area was planted in 1944.

Numerous seedlings have come back, many of which failed to survive. The surviving ribes have been fairly easy to eradicate since they are readily

accessible due to the clean burn. Some additional work adjacent to the burn area will be necessary in 1946 to adequately protect the planted area.

Camp 453	Township	Range	Sections in Which Work was Performed
F-164 (4-Cors.)	32N	45E	7, 18
	57N	5W	9, 13, 16
	58N	5W	25, 33, 34, 36

A 25-man crew of Mexicans started canker elimination on the Cuban Hill Plantation area on April 16. This work was carried on until May. Fifty-five thousand trees were treated on 110 acres in 338 man-days. The first Mexican crew started ribes eradication on May 3. The crew was built up to 90 Mexicans who remained on ribes eradication work until May 31. A total of 1,314 acres were worked, 340 of which were first work and 974 second work. The area was worked at the rate of .89 man-days per acre, 80 ribes per acre were removed. No checkers were available at the time of working. A later check revealed several spots that need reworking.

Camp 454	Township	Range	Sections in Which Work Was Performed
Squaw Valley	35N	45E	10, 11, 13, 14, 15, 24

This camp was made up of 50 German Internees. The entire group was used on a planting project during the latter part of May and until June 24. Ribes eradication work was done until August 15; 1,630 acres of first and second work were done at the rate of .74 man-days per acre, 67 ribes per acre were removed. Most of the work was done in 1935-36 cut-over. An advance survey was made on 4 sections of 1929 burn to determine feasibility of incorporating this area into the control area. This camp was on fire suppression 270 man-days. The camp closed down on the 16th of August.

Camp 455	Township	Range	Sections in Which Work Was Performed
Kalispell Creek	36N	45E	9, 10, 15, 16, 21, 22, 27, 28, 29, 33, 34

This camp was opened on May 22 when the first contingent of boys arrived on the job. The camp was operated as a boys camp until July 10 when the boys were replaced by 66 Mexicans. The boys were moved into the Diamond Creek camp (#452).

The boys worked 1,848 acres and removed 53 ribes per acre at the rate of .78 man-days per acre. The Mexicans worked 925 acres, removed 229 ribes per acre at the rate of 1.55 man-days per acre. The Mexicans were used on an area of heavy ribes concentration that was worked in order to increase the protection zone for a planted area.

Camp 456	Township	Range	Sections in Which Work was Performed
Zero Creek	37N	45E	1
	62N	5W	5, 6, 7, 8, 17, 18

The boy crew for this camp arrived on June 4. A total of 858 acres were worked, 48 acres of which were first, 270 acres second, and 540 third. The area was worked at the rate of 1.65 man-days and 335 ribes per acre for first work, 1.93 man-days and 73 ribes per acre for second work, 1.46 man-days and 68 ribes per acre for third work. The work was on the Zero Creek plantation and adjacent protection zone. To date the ribes have been very persistent. However, it appears that the area is now becoming rapidly stabilized. The plantation is on a 1926 reburn of an 1896 burn. Portions of the area around the plantation have come back to very heavy brush thus making a thorough eradication job difficult as evidenced by the man-day per acre figures. It is planned to relocate a camp in this drainage next season to complete the work of an adequate protection zone for the plantation.

Camp 457	Township	Range	Sections in Which Work was Performed
Lamb Creek	35N	45E	1, 2
	36N	45E	25, 26, 33, 34, 35, 36

The boy crew arrived in this camp on June 15. A total of 1,980 acres were worked at the rate of .37 man-days per acre and 38 ribes per acre were removed. Of the total acres worked there were 168 acres of first work on which an average of 183 ribes per acre were removed with the average man-day per acre rate of .73. On second work 414 acres were worked on which 31 ribes per acre were removed at the rate of .56 man-days per acre. On third work 1,398 acres were worked on which 22 ribes per acre were removed at the rate of .27 man-days per acre.

The work on this area was in and adjacent to the 1941 white pine plantation. The protection zone around this area was enlarged. Additional work is planned on this area next season.

Camp 458	Township	Range	Sections in Which Work was Performed
Tiger Hill	37N	42E	11, 13, 14, 23, 24, 25, 26, 27, 33, 34

This camp opened May 7 and was composed of 35 German Internees. The camp closed August 16 when the Germans were sent back to Fort Lincoln for reclassification.

A total of 3,890 acres were worked at the rate of .41 man-days per acre. An average of 42 ribes were removed per acre.

Of the total acres worked there were 770 acres of first work on which an average of 155 ribes per acre were removed at the rate of .50 man-days per acre.

There were 3,120 acres of second work on which an average of 14 ribes per acre were removed at the rate of .39 man-days per acre. Most of the work on this area was done on and adjacent to the Tiger Hill 1940 white pine plantation. Eradication work was done on 1,100 acres of pole.

CHECKING AND PINE DISEASE SURVEY

The checking force was composed of four regular Forest Service checkers, two Bureau and two German Internees. With the exception of the two internees, the checkers were high school students. All of the checkers had previous experience in blister rust control work and they were picked for this work for their ability to find ribes. One student and one internee had checking experience during the 1944 season.

All but 460 of the 20,095 acres worked were inspected by a four percent check, at a cost of $0.161 per acre. The current season's eradication constituted the majority of the checking work. Four sections of advance check were run adjacent to the 1945 western white pine plantation in Squaw Valley. This planting was outside the control area and an advance check was necessary to determine how much protection work should be done.

The checkers worked in pairs in order to facilitate supervision and to overcome the fear of being alone in the woods. The internee checkers inspected the work areas of two German internee camps. The regular 16-foot wide running strip was used by each checker for his method of sampling.

All units of 20 acres or more that did not meet acceptable standards according to the checking data were reworked with the exception of parts of the Diamond Creek and Zero Creek areas on which additional work is planned next season.

The checkers located areas for the rework crews and in some instances supervised these crews.

The students were not as competent as checkers used in prewar seasons but the main objectives of finding the ribes and designating rework areas were accomplished. A number of sample strips were run by the Assistant Regional Leader and the checker foreman to determine the efficiency of the checkers' work. In all cases the data submitted by the checker were substantiated.

A five day schooling for the checkers was conducted by the checker foreman. Four days were spent doing actual field work. One day was used for instructions on mapping, the use of forms, and the interpretation of data.

PINE DISEASE SURVEY

A party of three men conducted a pine disease survey on three areas in the forest. These were the Experiment Station plantation area, parts of the Benton Creek and Fox Creek drainages. The results are tabulated below:

FOX CREEK

Number trees examined	429
Number trees infected	105
Percent trees infected	24
Percent trees infected with killing cankers	8

The Fox Creek area has been a difficult one to protect due to heavy logging and a consequent slow stabilization of ribes. It must be noted that only eight percent of the trees in the area were infected with cankers close to or on the trunks and classed as killing cankers. Eighty-five percent of the infection was centered on 1940 and 1941 wood.

EXPERIMENT STATION PLANTATION AREA

Number trees examined	414
Number trees infected	97
Percent trees infected	23
Percent trees infected with killing cankers	3

The western white pine on this area was planted in 1934. The trees have a vigorous growth and average better than 13 feet in height. Only three percent of the trees are infected with trunk or killing cankers. Cankers were cut out this fall.

BENTON CREEK AREA

Number trees examined	409
Number trees infected	86
Percent trees infected	24
Percent trees infected with killing cankers	16

Sixty-two percent of the infection found was on 1940 and 1941 wood. This area was last worked in 1942 which was one year too late to avert the heavy 1941 wave of infection. Only three percent of the infection has occurred on later than 1941 wood.

The 1945 surveys are similar to those run during the past three years. They show the same data regarding the year of wood hit by infection and an increasing growth in new white pine reproduction. The pattern of infection by the year of wood hit is shown in the following table:

Year of wood hit	1936	1937	1938	1939	1940	1941	1942
Percent of infection	2	4	4	14	38	31	7

During the past nine years pine disease surveys have been undertaken in most of the drainages in the forest. These surveys have been run through areas worked by the CCC, ERA, Eq-Coop., and regular Forest Service employees. An analysis of these successive pine disease surveys conducted on the same areas shows a gain of 52 percent in new white pine reproduction as against a loss of 14 percent from blister rust.

All cankers found on the trunks of the trees or on limbs within eighteen inches of the trunk were recorded as killing cankers. Only 40 percent of the infection found could be classed as killing cankers.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following table by cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 9,906.46
	Regular BLR-3-4	27,109.24
	Subtotal	$ 37,015.70
State of Idaho	State BLR-3-4	$ 3,030.66
Priest Lake Timber Protective Association	Private BLR-3-4	2,469.34
	Subtotal	$ 5,500.00
Forest Service	Regular BLR-4	$236,832.77
Total		$281,348.47

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
KANIKSU OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	$5,527.61			$ 5,527.61	$ 6,509.83	$ 12,037.44
Sal. temp. men	697.06	$ 7,758.55	$ 900.91	9,356.52	28,304.35	37,660.87
Wages, temp. labs.	1,834.06	14,851.38	4,599.09	21,284.53	139,159.86	160,444.39
Subs. supplies	444.67	2,959.50		3,404.17	44,807.42	48,211.59
Equipment	135.72	454.27		589.99	15,410.65	16,000.64
Trucks						
Travel & transp.	773.71	430.31		1,204.02		1,204.02
Other supplies	493.63	655.23		1,148.86	4,640.66	5,789.52
Total	$9,906.46	$27,109.24	$5,500.00	$42,515.70	$236,832.77	$281,348.47

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
First	Plantation	1945-49	30	17	1,598	.57	53
	Cutover	1940-44	2,054	1,839	266,653	.90	130
	Cutover	1920-39	1,390	932	93,171	.67	67
	Reproduction	1910-39	881	1,167	628,384	1.32	713
	Pole		722	297	25,538	.41	35
	Miscellaneous		219	738	257,166	3.37	1,174
	Stream		67	321	100,116	4.79	1,494
	Total		5,363	5,311	1,372,626	.99	256
Second	Cutover	1940-44	352	199	7,107	.57	20
	Plantation	1940-44	2,603	1,389	45,757	.53	18
	Cutover	1920-39	522	371	34,486	.71	66
	Reproduction	1910-39	4,637	4,486	347,241	.97	75
	Pole		1,001	619	62,901	.62	63
	Mature		602	426	11,139	.71	19
	Stream		715	592	37,953	.83	53
	Total		10,432	8,082	546,584	.77	52
Third	Cutover	1920-39	1,718	1,484	72,073	.86	42
	Reproduction	1910-39	2,114	1,383	77,550	.65	37
	Pole		240	110	2,092	.46	9
	Mature		160	125	2,683	.78	17
	Stream		68	84	835	1.24	12
	Total		4,300	3,186	155,233	.74	36
All Workings	Plantation	1945-49	30	17	1,598	.57	53
	Cutover	1940-44	2,406	2,038	273,760	.85	114
	Plantation	1940-44	2,603	1,389	45,757	.53	18
	Cutover	1920-39	3,630	2,787	199,730	.77	55
	Reproduction	1910-39	7,632	7,036	1,053,175	.92	138
	Pole		1,963	1,026	90,531	.52	46
	Mature		762	551	13,822	.72	18
	Miscellaneous		219	738	257,166	3.37	1,174
	Stream		850	997	138,904	1.17	163
	Total		20,095	16,579	2,074,443	.83	103

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
KANIKSU OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
Idaho	First	EQ-Coop.	72	84	26,190	1.17	364
		FS-Reg.	504	489	38,425	.97	76
		Total	576	573	64,615	.99	112
	Second	EQ-Coop.	1,736	1,667	50,655	.96	29
		FS-Reg.	1,762	1,465	103,162	.83	59
		Total	3,498	3,132	153,817	.90	44
	Third	EQ-Coop.	2,118	1,719	76,848	.81	36
		FS-Reg.	540	791	36,597	1.46	68
		Total	2,658	2,510	113,445	.94	43
	All Workings	EQ-Coop.	3,926	3,470	153,693	.88	39
		FS-Reg.	2,806	2,745	178,184	.98	64
		Total	6,732	6,215	331,877	.92	49
Washington	First	FS-Reg.	4,787	4,738	1,308,011	.99	273
	Second	FS-Reg.	6,934	4,950	392,767	.71	57
	Third	FS-Reg.	1,642	676	41,788	.41	25
	All Workings	FS-Reg.	13,363	10,364	1,742,566	.78	130
Total	First	EQ-Coop.	72	84	26,190	1.17	364
		FS-Reg.	5,291	5,227	1,346,436	.99	254
		Total	5,363	5,311	1,372,626	.99	256
	Second	EQ-Coop.	1,736	1,667	50,655	.96	29
		FS-Reg.	8,696	6,415	495,929	.74	57
		Total	10,432	8,082	546,584	.77	52
	Third	EQ-Coop.	2,118	1,719	76,848	.81	36
		FS-Reg.	2,182	1,467	78,385	.67	36
		Total	4,300	3,186	155,233	.74	36
	All Workings	EQ-Coop.	3,926	3,470	153,693	.88	39
		FS-Reg.	16,169	13,109	1,920,750	.81	119
		Total	20,095	16,579	2,074,443	.83	103

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
KANIKSU OPERATION

State	Working	Acres Worked										
		By Forest Service			By Bureau of Entomology and Plant Quarantine			Total				
								Federal	Other			
		National Forest	Private	Total	State	Private	Total	National Forest	State	Private	Total	Total
Idaho	First	424	80	504		72	72	424		152	152	576
	Second	1,452	310	1,762	1,666	70	1,736	1,452	1,666	380	2,046	3,498
	Third	540		540	1,918	200	2,118	540	1,918	200	2,118	2,658
	Total	2,416	390	2,806	3,584	342	3,926	2,416	3,584	732	4,316	6,732
Washington	First	4,787		4,787				4,787				4,787
	Second	6,617	317	6,934				6,617		317	317	6,934
	Third	1,642		1,642				1,642				1,642
	Total	13,046	317	13,363				13,046		317	317	13,363
Total	First	5,211	80	5,291		72	72	5,211		152	152	5,363
	Second	8,069	627	8,696	1,666	70	1,736	8,069	1,666	697	2,363	10,432
	Third	2,182		2,182	1,918	200	2,118	2,182	1,918	200	2,118	4,300
	Total	15,462	707	16,169	3,584	342	3,926	15,462	3,584	1,049	4,633	20,095

TABLE 6

RIBES SPECIES ERADICATED, 1945
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Plantation (1945-49)	30	1,598			1,598
	Cutover (1940-44)	2,054	95,548	171,093	12	266,653
	Cutover (1920-39)	1,390	51,173	41,998		93,171
	Reproduction (1910-39)	881	27,206	601,178		628,384
	Pole	722	22,330	3,128	80	25,538
	Miscellaneous	219	10,028	247,138		257,166
	Stream	67	64,440		35,676	100,116
	All Types	5,363	272,323	1,064,535	35,768	1,372,626
Second	Cutover (1940-44)	352	3,019	4,088		7,107
	Plantation (1940-44)	2,603	11,560	34,197		45,757
	Cutover (1920-39)	522	22,971	11,159	356	34,486
	Reproduction (1910-39)	4,637	95,270	245,246	6,725	347,241
	Pole	1,001	13,765	49,136		62,901
	Mature	602	7,831	3,308		11,139
	Stream	715	31,356	362	6,235	37,953
	All Types	10,432	185,772	347,496	13,316	546,584
Third	Cutover (1920-39)	1,718	46,134	25,939		72,073
	Reproduction (1910-39)	2,114	8,799	68,751		77,550
	Pole	240	871	1,221		2,092
	Mature	160	1,712	971		2,683
	Stream	68	779	6	50	835
	All Types	4,300	58,295	96,888	50	155,233
All Workings	Plantation (1945-49)	30	1,598			1,598
	Cutover (1940-44)	2,406	98,567	175,181	12	273,760
	Plantation (1940-44)	2,603	11,560	34,197		45,757
	Cutover (1920-39)	3,630	120,278	79,096	356	199,730
	Reproduction (1910-39)	7,632	131,275	915,175	6,725	1,053,175
	Pole	1,963	36,966	53,485	80	90,531
	Mature	762	9,543	4,279		13,822
	Miscellaneous	219	10,028	247,138		257,166
	Stream	850	96,575	368	41,961	138,904
	All Types	20,095	516,390	1,508,919	49,134	2,074,443

TABLE 7

SUMMARY OF RIBES ERADICATION, 1923-1945
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes	Net Acreage Remaining Worked	Net Acreage Remaining Unworked
First	Plantation	1945-49	30	17	1,598	.57	53	30	473
	Cutover	1940-44	3,508	2,711	348,896	.77	99	3,508	40,526*
	Burn	1940-44	210	184	47,333	.88	225	210	
	Plantation	1940-44	2,631	1,317	490,404	.50	186	2,631	
	Cutover	1920-39	11,242	7,774	1,759,819	.69	157	10,668	25,311
	Reproduction	1910-39	165,145	116,680	32,309,633	.71	196	158,526	26,568
	Pole		122,751	42,813	6,045,812	.35	49	121,436	31,072
	Mature		141,985	30,312	5,783,074	.21	41	114,690	40,085
	Miscellaneous		6,954	4,215	1,697,669	.61	244	5,591	1,953
	Stream		22,281	49,216	9,260,987	2.21	416	21,637	7,535
	Total		476,737	255,239	57,745,225	.54	121	438,927	173,523
Second	Cutover	1940-44	352	199	7,107	.57	20	352	
	Plantation	1940-44	2,603	1,389	45,757	.53	18	2,603	
	Cutover	1920-39	6,548	8,227	1,735,137	1.26	265	6,548	
	Reproduction	1910-39	46,764	41,557	5,508,822	.89	118	45,856	
	Pole		18,668	9,366	730,616	.50	39	18,668	
	Mature		6,677	3,646	349,663	.55	52	6,677	
	Miscellaneous		808	386	41,065	.48	51	808	
	Stream		7,734	11,451	1,206,668	1.48	156	7,679	
	Total		90,154	76,221	9,624,835	.85	107	89,191	
Third	Cutover	1920-39	3,622	3,670	262,485	1.01	72	3,622	
	Reproduction	1910-39	13,881	13,707	1,123,365	.99	81	13,881	
	Pole		854	335	23,056	.39	27	854	
	Mature		464	395	54,265	.85	117	464	
	Miscellaneous		179	122	3,026	.68	17	179	
	Stream		1,108	1,435	61,715	1.30	56	1,108	
	Total		20,108	19,664	1,527,912	.98	76	20,108	
All Workings	Plantation	1945-49	30	17	1,598	.57	53	30	
	Cutover	1940-44	3,860	2,910	356,003	.75	92	3,860	
	Burn	1940-44	210	184	47,333	.88	225	210	
	Plantation	1940-44	5,234	2,706	536,161	.52	102	5,234	
	Cutover	1920-39	21,412	19,671	3,757,441	.92	175	20,838	
	Reproduction	1910-39	225,790	171,944	38,941,820	.76	172	218,263	
	Pole		142,273	52,514	6,799,484	.37	48	140,958	
	Mature		149,126	34,353	6,187,002	.23	41	121,831	
	Miscellaneous		7,941	4,723	1,741,760	.59	219	6,578	
	Stream		31,123	62,102	10,529,370	2.00	338	30,424	
	Total		586,999	351,124	68,897,972	.60	117	548,226	

*Includes 1945 unworked cutover 3,500 acres.

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923 - 1945
KANIKSU OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Per Acre Man-Days	Per Acre Ribes
Idaho	EQ-Reg.	18,796	6,844	1,066,689	.36	57
	EQ-Coop.	129,371	48,636	10,791,502	.38	83
	EQ-Emerg.	99,041	68,851	11,333,497	.70	114
	FS-Reg.	40,746	40,287	4,648,928	.99	114
	FS-Emerg.	99,269	38,823	8,788,474	.39	89
	CCC	62,419	50,478	8,451,835	.81	135
	Total	449,642	253,919	45,080,925	.56	100
Washington	EQ-Emerg.	31,629	19,288	6,754,071	.61	214
	FS-Reg.	47,034	38,826	9,562,483	.83	203
	FS-Emerg.	36,366	14,386	4,013,260	.40	110
	CCC	22,328	24,705	3,487,233	1.11	156
	Total	137,357	97,205	23,817,047	.71	173
Idaho Washington	EQ-Reg.	18,796	6,844	1,066,689	.36	57
	EQ-Coop.	129,371	48,636	10,791,502	.38	83
	EQ-Emerg.	130,670	88,139	18,087,568	.67	138
	FS-Reg.	87,780	79,113	14,211,411	.90	162
	FS-Emerg.	135,635	53,209	12,801,734	.39	94
	CCC	84,747	75,183	11,939,068	.89	141
	Total	586,999	351,124	68,897,972	.60	117

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923 - 1945
KANIKSU OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres	Total
		First	Second	Third	Total	Unworked	Acres
Idaho	National Forest	176,562	35,952	2,635	215,149	59,147	235,709
	Public Domain	54			54	80	134
	Subtotal Federal	176,616	35,952	2,635	215,203	59,227	235,843
	State	104,781	18,220	9,632	132,633	30,256	135,037
	Private	64,932	9,869	1,408	76,209	45,155	110,087
	Subtotal Other	169,713	28,089	11,040	208,842	75,411	245,124
	Total	346,329	64,041	13,675	424,045	134,638	480,967
Washington	National Forest	85,735	23,735	6,241	115,711	34,913	120,648
	Subtotal Federal	85,735	23,735	6,241	115,711	34,913	120,648
	State	2,080			2,080		2,080
	Private	4,783	1,415	192	6,390	3,972	8,755
	Subtotal Other	6,863	1,415	192	8,470	3,972	10,835
	Total	92,598	25,150	6,433	124,181	38,885	131,483
Total	National Forest	262,297	59,687	8,876	330,860	94,060	356,357
	Public Domain	54			54	80	134
	Subtotal Federal	262,351	59,687	8,876	330,914	94,140	356,491
	State	106,861	18,220	9,632	134,713	30,256	137,117
	Private	69,715	11,284	1,600	82,599	49,127	118,842
	Subtotal Other	176,576	29,504	11,232	217,312	79,383	255,959
	Total	438,927	89,191	20,108	548,226	173,523	612,450

TABLE 10

RIBES SPECIES ERADICATED, 1923 - 1945
KANIKSU OPERATION

Working	Eradication Type	Gross Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Plantation (1945-49)	30	1,598					1,598
	Cutover (1940-44)	3,508	141,218	207,666	12			348,896
	Burn (1940-44)	210	18,015	29,318				47,333
	Plantation (1940-44)	2,631	72,450	417,954				490,404
	Cutover (1920-39)	11,242	702,928	1,009,008	47,883			1,759,819
	Reproduction (1910-39)	165,145	9,329,687	22,750,897	226,102	2,947		32,309,633
	Pole	122,751	2,906,595	2,905,074	208,515	21,714	3,914	6,045,812
	Mature	141,985	4,011,599	1,614,889	154,559		2,027	5,783,074
	Miscellaneous	6,954	348,323	1,280,809	68,537			1,697,669
	Stream	22,281	4,925,272	425,512	3,890,619		19,584	9,260,987
	All Types	476,737	22,457,685	30,641,127	4,596,227	24,661	25,525	57,745,225
Second	Cutover (1940-44)	352	3,019	4,088				7,107
	Plantation (1940-44)	2,603	11,560	34,197				45,757
	Cutover (1920-39)	6,548	382,363	1,338,470	14,304			1,735,137
	Reproduction (1910-39)	46,764	1,586,988	3,879,898	41,936			5,508,822
	Pole	18,668	328,034	391,439	11,143			730,616
	Mature	6,677	180,149	165,433	4,081			349,663
	Miscellaneous	808	24,827	15,363	875			41,065
	Stream	7,734	670,890	74,101	461,677			1,206,668
	All Types	90,154	3,187,830	5,902,989	534,016			9,624,835
Third	Cutover (1920-39)	3,622	150,804	106,680	5,001			262,485
	Reproduction (1910-39)	13,881	315,668	805,066	2,631			1,123,365
	Pole	854	8,178	14,753	125			23,056
	Mature	464	7,098	47,167				54,265
	Miscellaneous	179	1,109	1,893	24			3,026
	Stream	1,108	46,248	4,215	11,252			61,715
	All Types	20,108	529,105	979,774	19,033			1,527,912
All Workings	Plantation (1945-49)	30	1,598					1,598
	Cutover (1940-44)	3,860	144,237	211,754	12			356,003
	Burn (1940-44)	210	18,015	29,318				47,333
	Plantation (1940-44)	5,234	84,010	452,151				536,161
	Cutover (1920-39)	21,412	1,236,095	2,454,158	67,188			3,757,441
	Reproduction (1910-39)	225,790	11,232,343	27,435,861	270,669	2,947		38,941,820
	Pole	142,273	3,242,807	3,311,266	219,783	21,714	3,914	6,799,484
	Mature	149,126	4,198,846	1,827,489	158,640		2,027	6,187,002
	Miscellaneous	7,941	374,259	1,298,065	69,436			1,741,760
	Stream	31,123	5,642,410	503,828	4,363,548		19,584	10,529,370
	All Types	586,999	26,174,620	37,523,890	5,149,276	24,661	25,525	68,897,972

BLISTER RUST CONTROL WORK, MONTANA OPERATION, 1945

By

A. S. Skoglund, Operation Supervisor

INTRODUCTION

Blister rust control operations were conducted on both the Cabinet and Kootenai National Forests.

A total of 5,012 acres were worked with an expenditure of 8,089 man-days of labor. The net acres on the Montana Operation are 132,344 acres initially worked and 16,526 acres reworked. 75,709 acres are still in need of initial ribes eradication.

Mexican Nationals were used as a class of labor for the first time in control operations in Montana. The group reporting for the spring period performed very well but the group returning around July 20 were a very mediocre class of labor. Teen-age high school boys made up the remainder of the workers.

The progress of work was somewhat disappointing this year. A late spring prevented crews from getting started effectively until after the first week of May. A dry summer with numerous fires commanded the major efforts of the crews from July 21 until after Labor Day. A total of 8,089 man-days were spent on blister rust while 7,737 man-days were spent on fires. The progress of 1945 work by classes of labor is as follows:

Forest	Labor	Number Workers	Ribes Eradication			Canker Elimination	
			Acres	Man-Days	Ribes	Trees Treated	Man-Days
Cabinet	Student	80	538	1,161	32,565		
	Mexican Nationals	100	886	2,589	179,035	36,000	300
Kootenai	Student	90	1,885	2,516	150,562	600	10
	Mexican Nationals	71	1,703	1,823	91,458	3,800	45

ORGANIZATION AND ADMINISTRATION

The respective forests were responsible for the administration and maintenance of the camps and technical supervision was provided by the Bureau of Entomology and Plant Quarantine.

The field organization was as follows:

Bureau of Entomology and Plant Quarantine

A. S. Skoglund, Operation Supervisor

U. S. Forest Service

L. J. Cummings, Forest Officer, Cabinet Forest
H. E. Ahlskog, Forest Officer, Kootenai Forest
Emil Keck, Unit Supervisor Kootenai Forest

Camp Locations

Drainage	T.	R.	S.	Date Established	Date Closed	Class of Labor	Size
				Cabinet National Forest			
Big Creek	19N	30W	27	June 1	July 20	Boys	30
				April 3	Sept. 28	Mex.	100
Rainy Creek	19N	32W	13	June 26	Aug. 14	Boys	50
				Kootenai National Forest			
Yaak River	34N	33W	10	April 3	May 28	Mex.	50
Stanley Creek	29N	33W	7	June 1	Aug. 24	Boys	45
				May 5	Sept. 28	Mex.	35
Star Creek	32N	35W	14	June 1	July 25	Boys	45
Burnt Creek	34N	34W		July 20	Aug. 25	Mex.	35
Red Top Creek	34N	34W	1	July 20	Sept. 21	Mex.	36

LOCATION AND DESCRIPTION OF AREAS

In the Cabinet Forest work was performed in the vicinity of Haugan and on Rainy Creek. Both initial and second workings were performed around Haugan Lookout. *Ribes viscosissimum* was the only species present in this area. Initial work was performed on the area immediately east and north of Rivers Peak Lookout. This is an area of reproduction originating on a 1919 reburn of a 1910 burn with heavy concentrations of *R. viscosissimum* and is adjacent to a thrifty 1924 plantation. Stream type along lower Big Creek was also mopped up. These areas are included in secs. 15, 20, 21, 22, 26, 27, 28, 29, 31, 32, 33 and 34 on T. 19 N., R. 30 W., and in secs. 5 and 6 of T. 18 N., R. 30 W. Some initial and rework was carried on in Rainy Creek and is located in secs. 14 and 23 of T. 19 N., R. 32 W.

Initial working was accomplished on the Star Creek plantation unit in the Kootenai Forest. This area was planted just prior to working and contained relatively few ribes. The workings are contained within secs. 11, 12, and 14 of T. 32 N., R. 35 W. and secs. 14, 23, 26 and 27 in T. 60 N., R. 3 E., B.P.M.

Some work was done in sec. 1 of T. 34 N., R. 33 W., of Burnt Creek. Only *R. lacustre* was found in the work area. This drainage contains some very fine bodies of 45 year old white pine pole intermingled with some thrifty reproduction.

Second working was given to the 45 year pole stands in Red Top Creek with *R. lacustre* only being found. This working was within sec. 31 of T. 35 N., R. 33 W., sec. 36 of T. 35 N., R. 24 W., secs. 1, 11 and 12 of T. 34 N., R. 24 W., and sec. 6 of T. 34 N., R. 33 W.

A small amount of work was done in the Yaak River stream type in sec. 10 of T. 34 N., R. 33 W.

The few remaining ribes were removed from the fine pole stand in upper Thicket Creek. R. viscosissimum were also removed from along the roadside leading to Keeler Mountain Lookout. This work was included in secs. 1, 2, 3, 10, 11, and 12 of T. 29 N., R. 34 W.

First working was performed on Lake Creek drainage in secs. 5, 6, 7 and 8 of T. 29 N., R. 33 W. This area was cut of all merchantable white pine in 1939, resulting in clear cut in portions to very little disturbance in other portions. The lighter cuts for the most part left a good stocking of white pine pole and reproduction with few ribes becoming established. The clear cut portions contained numerous R. irriguum and R. inerme. Heavy concentrations of infected ribes occurred along the major stream.

METHODS AND EQUIPMENT

Standard methods were used supplemented by slight variations to overcome difficulties caused by the influences of site, season and labor deficiencies. One variation was the adoption of the flanker checker system to work the Star Creek plantation area of 4 or 5 ribes per acre. The timing of the operation was one of the keys to the practicability of the plan with the area being left as long as possible to allow for more height growth to the bushes but completing operations prior to the full season development of annuals and brush. The operation was successful in that practically all ribes were removed at a very low man-day cost.

Proper timing of ribes eradication in brush areas can serve to increase efficiency and reduce cost. In light ribes areas and in case of second working, ribes eradication should be completed early in the season prior to full foliation of the brush. Work in the brush areas with many ribes can be performed later in the season without much loss in efficiency since the pulling of ribes rather than searching is the major factor.

A small patch of R. viscosissimum seedlings on cut-over lands was sprayed with ammonium sulfamate early in September. The results of this treatment may not be observed until summer of next year. The problem of eradication of small ribes on cut-over lands may be materially lessened if spraying is successful.

CHECKING

All areas containing over 10 ribes per acre were given a regular check following work by crews.

Areas containing around 3 ribes per acre were checked by the flanker method. A checker laying a string line by means of a string ball carrier was assisted by 2 flankers working on the same side of the checker. This enabled them to always work between string lines. These areas were checked prior to full season development of brush.

Checking of areas containing between 3 to 10 ribes per acre has been deferred until next spring.

CONTROL STATUS

In the Cabinet Forest the status of control has not changed materially from that of last year.

The amount of work performed in Rainy Creek area was not significant in the reduction of ribes and undoubtedly more damage occurred this past season.

A disease survey performed on the 1924 plantation in Big Creek indicated about 36 percent of the trees are infected. The removal of the ribes east of Rivers Peak Lookout should reduce the spread of rust into this stand. The completion of this work next season should afford protection from any further serious damage.

Considerable infection in the first few chains from the stream type is found on the left hand fork of the West Fork of Big Creek. This area should be worked next season to prevent any further build-up. No appreciable damage has occurred in the right hand fork and the planned extension of the area further up the creek should prevent further damage.

The percentage of infection found in the seed beds at Savenac Nursery has dropped each year since the first working of Haugan Lookout area. Only one infected specimen was found out of 8,500 2-year old trees examined. Although a favorable spread year has not occurred since the lookout area was worked, present results are very encouraging and indicate that previous infection must have come from the large volume of spores originating on the masses of ribes which were formerly around the lookout. The second working in 1945 should prevent any serious future spread to the seedlings.

Very heavy pine infection occurs in the Lake Creek drainage of the Kootenai Forest. A high percentage of the cankers are trunk cankers and have resulted, or shortly will result, in the killing of many trees. The zone of infection spreads out from the stream type for a distance of 20 chains. Large concentrations of highly susceptible stream type ribes occur along this stream, and could best be removed by bulldozer. Due to intermingled ownership cooperative action is necessary, and steps have already been instituted to afford a satisfactory solution. Unprotected, this area would result in a serious center of infection capable of causing considerable damage to adjoining stands.

The work performed this year on Thicket Creek should afford ample protection to this stand. The plantation in a broadcast burn area on Star Creek has been afforded protection. Additional work will be necessary along the upper rim of the plantation and careful and periodic inspections should be made for possible long-distance spread from Raymond Creek.

Considerable advance survey was run in Burnt Creek. Last year's observations were borne out in that it contains an excellent stand of white pine of reproduction and pole size. This same type of stand extends up the Yaak River into the Lucky and Little Creek drainages. Very little infection has been found and with the anticipated program little damage is expected. Vivian Creek, a branch of Burnt Creek, is probably the most critical area as it contains R. viscosissimum intermingled with white pine production on a single burn.

Very little infection has been found in the 45 year pole stand in Red Top Creek and except for an occasional isolated hit in worked area, the only infection found was in an unworked drainage below Red Top Lookout.

Of the 5,012 acres worked this season 2,362 acres are on maintenance, 1,639 acres are on post check and 1,011 acres are on rework.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs by cooperative agency and type of appropriation is shown in the following tabulations:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
MONTANA OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 2,609.28
Cabinet National Forest	Regular BLR-4	91,551.98
Kootenai National Forest	Regular BLR-4	64,652.50
Total		$158,813.76

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
MONTANA OPERATION

Item	Bureau of Entomology and Plant Quarantine	Cabinet National Forest	Kootenai National Forest	Total
	Regular BLR-1-4	Regular BLR-4	Regular BLR-4	
Sal., perm. men	$2,261.08	$ 2,753.98	$ 2,761.76	$ 7,776.82
Sal., temp. men		1,300.00	4,967.73	6,267.73
Wages, temp. labs.		58,980.00	38,354.97	97,334.97
Subs. supplies		15,642.00	11,224.70	26,866.70
Equipment		9,148.00	2,362.96	11,510.96
Travel & transp.	348.20	1,417.00	1,207.83	2,973.03
Other supplies		2,311.00	3,772.55	6,083.55
Total	$2,609.28	$91,551.98	$64,652.50	$158,813.76

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
MONTANA OPERATION

Forest	Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes
Cabinet	First	Reproduction	1910-39	565	1,751	123,116	3.10	218
		Stream (1)		18	267	26,220	14.83	1,457
		Total		583	2,018	149,336	3.46	256
	Second	Reproduction	1910-39	325	1,008	38,241	3.10	118
		Total		325	1,008	38,241	3.10	118
	Third and Other	Reproduction	1910-39	137	103	2,124	.75	16
		Stream (3)		379	621	21,899	1.64	58
		Total		516	724	24,023	1.40	47
	All Workings	Reproduction	1910-39	1,027	2,862	163,481	2.79	159
		Stream (4)		397	888	48,119	2.24	121
		Total		1,424	3,750	211,600	2.63	149
Kootenai	First	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	74	43	706	.58	10
		Pole		628	252	22,520	.40	36
		Mature		286	5		.02	
		Stream		243	1,298	112,165	5.34	462
		Total		2,595	2,464	191,216	.95	74
	Second	Reproduction	1910-39	375	202	5,158	.54	14
		Pole		339	494	13,135	1.46	39
		Stream		124	889	21,413	7.17	173
		Total		838	1,585	39,706	1.89	47
	Third	Pole		133	276	10,360	2.08	78
		Stream		22	14	738	.64	34
		Total		155	290	11,098	1.87	72
	All Workings	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	449	245	5,864	.55	13
		Pole		1,100	1,022	46,015	.93	42
		Mature		286	5		.02	
		Stream		389	2,201	134,316	5.66	345
		Total		3,588	4,339	242,020	1.21	67
All Forests	First	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	639	1,794	123,822	2.81	194
		Pole		628	252	22,520	.40	36
		Mature		286	5		.02	
		Stream (1)		261	1,565	138,385	6.00	530
		Total		3,178	4,482	340,552	1.41	107
	Second	Reproduction	1910-39	700	1,210	43,399	1.73	62
		Pole		339	494	13,135	1.46	39
		Stream		124	889	21,413	7.17	173
		Total		1,163	2,593	77,947	2.23	67
	Third and Other	Reproduction	1910-39	137	103	2,124	.75	16
		Pole		133	276	10,360	2.08	78
		Stream (3)		401	635	22,637	1.58	56
		Total		671	1,014	35,121	1.51	52
	All Workings	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	1,476	3,107	169,345	2.11	115
		Pole		1,100	1,022	46,015	.93	42
		Mature		286	5		.02	
		Stream (4)		786	3,089	182,435	3.93	232
		Total		5,012	8,089	453,620	1.61	91

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	3	7	65
(3)	15	31	165
(4)	18	38	230

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
MONTANA OPERATION

Forest	Working	Acres Worked By Forest Service		
		National Forest	Private	Total
Cabinet	First	453	130	583
	Second	267	58	325
	Third	301	215	516
	Total	1,021	403	1,424
Kootenai	First	1,667	928	2,595
	Second	822	16	838
	Third	155		155
	Total	2,644	944	3,588
All Forests	First	2,120	1,058	3,178
	Second	1,089	74	1,163
	Third	456	215	671
	Total	3,665	1,347	5,012

TABLE 5

RIBES SPECIES ERADICATED, 1945
MONTANA OPERATION

Forest	Working	Eradication Type	Acres	Ribes Species				Total Ribes
				Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	
Cabinet	First	Reproduction (1910-39)	565	11,729	111,387			123,116
		Stream	18	4,969		705	20,546	26,220
		All Types	583	16,698	111,387	705	20,546	149,336
	Second	Reproduction (1910-39)	325	600	37,641			38,241
		All Types	325	600	37,641			38,241
	Third	Reproduction (1910-39)	137	12	2,112			2,124
		Stream	379	10,045		2,512	9,342	21,899
		All Types	516	10,057	2,112	2,512	9,342	24,023
	All Workings	Reproduction (1910-39)	1,027	12,341	151,140			163,481
		Stream	397	15,014		3,217	29,888	48,119
		All Types	1,424	27,355	151,140	3,217	29,888	211,600
Kootenai	First	Plantation (1945-49)	244	814	4,648			5,462
		Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	74	704	2			706
		Pole	628	14,841	7,679			22,520
		Mature	286					
		Stream	243	96,803	345		15,017	112,165
		All Types	2,595	133,096	43,103		15,017	191,216
	Second	Reproduction (1910-39)	375	5,158				5,158
		Pole	339	12,315	820			13,135
		Stream	124	21,413				21,413
		All Types	838	38,886	820			39,706
	Third	Pole	133	9,631	729			10,360
		Stream	22	725	13			738
		All Types	155	10,356	742			11,098
	All Workings	Plantation (1945-49)	244	814	4,648			5,462
		Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	449	5,862	2			5,864
		Pole	1,100	36,787	9,228			46,015
		Mature	286					
		Stream	389	118,941	358		15,017	134,316
		All Types	3,588	182,338	44,665		15,017	242,020
All Forests	First	Plantation (1945-49)	244	814	4,648			5,462
		Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	639	12,433	111,389			123,822
		Pole	628	14,841	7,679			22,520
		Mature	286					
		Stream	261	101,772	345	705	35,563	138,385
		All Types	3,178	149,794	154,490	705	35,563	340,552
	Second	Reproduction (1910-39)	700	5,758	37,641			43,399
		Pole	339	12,315	820			13,135
		Stream	124	21,413				21,413
		All Types	1,163	39,486	38,461			77,947
	Third	Reproduction (1910-39)	137	12	2,112			2,124
		Pole	133	9,631	729			10,360
		Stream	401	10,770	13	2,512	9,342	22,637
		All Types	671	20,413	2,854	2,512	9,342	35,121
	All Workings	Plantation (1945-49)	244	814	4,648			5,462
		Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	1,476	18,203	151,142			169,345
		Pole	1,100	36,787	9,228			46,015
		Mature	286					
		Stream	786	133,955	558	3,217	44,905	182,435
		All Types	5,012	209,693	195,805	3,217	44,905	453,620

TABLE 6

SUMMARY OF RIBES ERADICATION, 1928-1945
MONTANA OPERATION

Forest	Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre Man-Days	Per Acre Ribes	Net Acreage Remaining Worked	Net Acreage Remaining Unworked
Cabinet	First	Reproduction	1910-39	34,930	33,121	6,261,168	.95	179	34,361	6,735
		Pole		25,959	9,213	1,745,885	.35	67	25,670	7,134
		Mature		9,297	4,447	1,064,328	.48	114	9,277	1,792
		Miscellaneous		4,900	2,230	596,499	.46	122	4,657	
		Stream (1)		5,019	16,011	3,617,610	3.19	721	5,019	
		Total		80,105	65,022	13,285,490	.81	166	78,984	15,661
	Second	Reproduction	1910-39	5,599	8,473	800,441	1.51	143	5,599	
		Pole		1,108	1,423	101,767	1.28	92	1,108	
		Mature		28	27	1,799	.96	64	28	
		Miscellaneous		33	34	1,503	1.03	46	33	
		Stream (2)		2,990	5,395	558,353	1.80	187	2,990	
		Total		9,758	15,352	1,463,863	1.57	150	9,758	
	Third and Other	Reproduction	1910-39	1,314	1,079	83,778	.82	64	1,314	
		Pole		125	149	7,256	1.19	58	125	
		Stream (3)		2,911	3,621	174,182	1.24	60	2,911	
		Total		4,350	4,849	265,216	1.11	61	4,350	
	All Workings	Reproduction	1910-39	41,843	42,673	7,145,387	1.02	171	41,274	
		Pole		27,192	10,785	1,854,908	.40	68	26,903	
		Mature		9,325	4,474	1,066,127	.48	114	9,305	
		Miscellaneous		4,933	2,264	598,002	.46	121	4,690	
		Stream (4)		10,920	25,027	4,350,145	2.29	398	10,920	
		Total		94,213	85,223	15,014,569	.90	159	93,092	
Kootenai	First	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1940-44							5,739
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	3,761
		Reproduction	1910-39	13,238	8,743	1,079,961	.66	82	12,504	10,318
		Pole		20,698	8,098	873,654	.39	42	19,786	23,526
		Mature		17,077	4,372	594,358	.26	35	16,072	16,704
		Miscellaneous		346	95	7,956	.27	23	346	
		Stream		3,472	10,444	1,445,625	3.01	416	3,244	
		Total		56,239	32,636	4,057,953	.58	72	53,360	60,048
	Second	Reproduction	1910-39	716	367	30,680	.51	43	716	
		Pole		1,118	1,101	53,625	.98	48	1,118	
		Stream		657	1,694	84,288	2.58	128	429	
		Total		2,491	3,162	168,593	1.27	68	2,263	
	Third	Pole		133	276	10,360	2.08	78	133	
		Stream		22	14	738	.64	34	22	
		Total		155	290	11,098	1.87	72	155	
	All Workings	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	
		Reproduction	1910-39	13,954	9,110	1,110,641	.65	80	13,220	
		Pole		21,949	9,475	937,639	.43	43	21,037	
		Mature		17,077	4,372	594,358	.26	35	16,072	
		Miscellaneous		346	95	7,956	.27	23	346	
		Stream		4,151	12,152	1,530,651	2.93	369	3,695	
		Total		58,885	36,088	4,237,644	.61	72	55,778	
All Forests	First	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1940-44							5,739
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	3,761
		Reproduction	1910-39	48,168	41,864	7,341,129	.87	152	46,865	17,053
		Pole		46,657	17,311	2,619,539	.37	56	45,456	30,660
		Mature		26,374	8,819	1,658,686	.33	63	25,349	18,496
		Miscellaneous		5,246	2,325	604,455	.44	115	5,003	
		Stream (1)		8,491	26,455	5,063,235	3.12	596	8,263	
		Total		136,344	97,658	17,343,443	.72	127	132,344	75,709
	Second	Reproduction	1910-39	6,315	8,840	831,121	1.40	132	6,315	
		Pole		2,226	2,524	155,392	1.13	70	2,226	
		Mature		28	27	1,799	.96	64	28	
		Miscellaneous		33	34	1,503	1.03	46	33	
		Stream (2)		3,647	7,089	642,641	1.94	176	3,419	
		Total		12,249	18,514	1,632,456	1.51	133	12,021	
	Third and Other	Reproduction	1910-39	1,314	1,079	83,778	.82	64	1,314	
		Pole		258	425	17,616	1.65	68	258	
		Stream (3)		2,933	3,635	174,920	1.24	60	2,933	
		Total		4,505	5,139	276,314	1.14	61	4,505	
	All Workings	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	
		Reproduction	1910-39	55,797	51,783	8,256,028	.93	148	54,494	
		Pole		49,141	20,260	2,792,547	.41	57	47,940	
		Mature		26,402	8,846	1,660,485	.34	63	25,377	
		Miscellaneous		5,279	2,359	605,958	.45	115	5,036	
		Stream (4)		15,071	37,179	5,880,796	2.47	390	14,615	
		Total		153,098	121,311	19,252,213	.79	126	148,870	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	707	1,964	57,890
(2)	178	379	11,146
(3)	27	179	3,710
(4)	912	2,522	72,746

TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1945
MONTANA OPERATION

Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Per Acre Ribes
EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
EQ-Emergency	66,076	30,787	5,775,415	1,330	.47	87
FS-Reg.	34,833	39,169	3,875,356	8,658	1.12	111
FS-Emergency	35,712	35,620	7,367,723	21,638	1.00	206
CCC	14,475	12,440	1,472,009	6,325	.86	102
Total	153,098	121,311	19,252,213	72,746	.79	126

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1945
MONTANA OPERATION

Forest	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Cabinet	National Forest	61,995	7,779	2,584	72,358	11,599	73,594
	Public Domain	40			40		40
	Subtotal Federal	62,035	7,779	2,584	72,398		73,634
	State	734	1		735		734
	Private	16,215	1,978	1,766	19,959	4,062	20,277
	Subtotal Other	16,949	1,979	1,766	20,694	4,062	21,011
	Total	78,984	9,758	4,350	93,092	15,661	94,645
Kootenai	National Forest	50,234	1,987	155	52,376	48,823	99,057
	State					173	173
	Private	3,126	276		3,402	11,052	14,178
	Subtotal Other	3,126	276		3,402	11,225	14,351
	Total	53,360	2,263	155	55,778	60,048	113,408
All Forests	National Forest	112,229	9,766	2,739	124,734	60,422	172,651
	Public Domain	40			40		40
	Subtotal Federal	112,269	9,766	2,739	124,774		172,691
	State	734	1		735	173	907
	Private	19,341	2,254	1,766	23,361	15,114	34,455
	Subtotal Other	20,075	2,255	1,766	24,096	15,287	35,362
	Total	132,344	12,021	4,505	148,870	75,709	208,053

TABLE 9

RIBES SPECIES ERADICATED, 1928-1945
MONTANA OPERATION

Working	Eradication Type	Gross Acres	Ribes Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes trists	
First	Plantation (1945-49)	244	814	4,648						5,462
	Cutover (1920-39)	1,164	20,337	30,431		72	97			50,937
	Reproduction (1910-39)	48,168	3,408,768	3,752,430	4,714	55,752	114,802	3,518	1,145	7,341,129
	Pole	46,657	1,471,173	959,770	200	103,756	84,338	302		2,619,539
	Mature	26,374	1,452,632	178,729	259	11,080	8,729	7,257		1,658,686
	Miscellaneous	5,246	291,724	295,188		12,381	5,162			604,455
	Stream	8,491	3,264,543	120,112	266,711	1,351,897	5,744	33,105	21,123	5,063,235
	All Types	136,344	9,909,991	5,341,308	271,884	1,534,938	218,872	44,182	22,268	17,343,443
Second	Reproduction (1910-39)	6,315	468,510	339,826	4,860	4,668	10,666		2,591	831,121
	Pole	2,226	116,481	31,452	119	6,419	921			155,392
	Mature	28	1,799							1,799
	Miscellaneous	33	877	626						1,503
	Stream	3,647	217,002	5,776	48,208	352,846	10,975		7,834	642,641
	All Types	12,249	804,669	377,680	53,187	363,933	22,562		10,425	1,632,456
Third	Reproduction (1910-39)	1,314	47,612	35,759	93		200		114	83,778
	Pole	258	11,161	5,789		660	6			17,616
	Stream	2,933	33,192	464	38,417	87,105			15,742	174,920
	All Types	4,505	91,965	42,012	38,510	87,765	206		15,856	276,314
All Workings	Plantation (1945-49)	244	814	4,648						5,462
	Cutover (1920-39)	1,164	20,337	30,431		72	97			50,937
	Reproduction (1910-39)	55,797	3,924,890	4,128,015	9,667	60,420	125,668	3,518	3,850	8,256,028
	Pole	49,141	1,598,815	997,011	319	110,835	85,265	302		2,792,547
	Mature	26,402	1,454,431	178,729	259	11,080	8,729	7,257		1,660,485
	Miscellaneous	5,279	292,601	295,814		12,381	5,162			605,958
	Stream	15,071	3,514,737	126,352	353,336	1,791,848	16,719	33,105	44,699	5,880,796
	All Types	153,098	10,806,625	5,761,000	363,581	1,986,636	241,640	44,182	48,549	19,252,213

BLISTER RUST CONTROL, MOUNT RAINIER NATIONAL PARK, 1945

By

M. C. Riley, Operation Supervisor

Ribes eradication work for the control of white pine blister rust on Mount Rainier National Park was conducted by a crew with top strength of 30 men and was financed with regular funds allotted to the National Park Service. Work was performed entirely on the Longmire control area which also includes the white pine stand in and adjacent to the Silver Forest. The worked area is situated in unsurveyed secs. 13, 14, 15, 22, 23, 24, 28, 29, 32 and 33, T. 15 N., R. 8 E., Willamette Meridian. Crews started on June 7 and continued through the month of August.

No experienced blister rust foreman was available. The late spring caused considerable difficulty at the start of the work since ribes were not sufficiently leafed out for identification except in relatively small patches. This necessitated moving the crew many times and made for slow progress during June. As the new foreman and his assistant became more familiar with the work and the area, more satisfactory results were obtained. The month of August saw much time spent on fire outside the National Park and this interfered materially with the orderly progress of the work.

While the work of the 1945 season was not of a quality comparable with that of the previous two seasons, it is felt that no further ribes eradication work will be necessary on the Longmire control area until 1947. This is one year earlier than was anticipated when the schedule of recommendations and estimates in the 1944 annual report was drawn up. This is partially due to poor work on some small patches where time did not permit a mop-up job and partially to a seedling problem in connection with some Ribes acerifolium areas on the north side of the Silver Forest. There is not enough of this work to warrant training a crew in 1946 and it can very well be done in connection with the proposed program recommended for the 1947 field season.

A new method of marking crew lanes with string was tried out for a short period this year for crews working in adjoining strips. It consisted of a string man with each crew using a "trailer string", dragging about fifty feet of twine along to mark the strip, in place of laying the string in advance as had been done previously. The system was not satisfactory because the attention of the string man was divided between pulling ribes and watching to see that he was not too far ahead of the adjoining crew and crews could not be so organized that slow men were not retarding faster men and causing considerable lost time.

It will be noted, in comparing the figures on a "per acre" basis in this report with those for 1944, that stream type shows a reduction in ribes removed. Of the stream type worked this year a considerable portion will not have to be worked for seven or eight years unless some unforeseen disturbance occurs. The same can be said of at least one-half of the pole area worked this season. The higher ribes per acre figure is caused by the seedling problem mentioned above.

RECOMMENDATIONS

No ribes eradication work is anticipated for the 1946 field season. However, there is an urgent need for checking and disease survey work, especially on the White River area. No checking has been done since the last ribes eradication work and it is essential that a systematic checking sample be secured on areas worked the past two seasons in order to properly plan future ribes eradication activities. A disease survey, which could very well be combined with the checking work, is needed in order to assist in planning future work and to give a measure of the effectiveness of ribes eradication and canker elimination performed thus far. Every effort possible should be made to secure personnel for this checking and disease survey.

RESULTS

The following tables show statements of expenditures, results of the 1945 field work and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 747.33
National Park Service	Regular BLR-5	13,595.65
Total		$14,342.98

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
MOUNT RAINIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	$618.23		$ 618.23
Personal services		$12,960.75	12,960.75
Travel and transp.	129.10	69.58	198.68
Contractual services		343.24	343.24
Supplies and material		222.08	222.08
Total	$747.33	$13,595.65	$14,342.98

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species: Ribes lacustre	Ribes bracteosum	Ribes laxiflorum	Ribes acerifolium	Total Ribes	Per Acre Basis: Man-Days	Ribes
Longmire	Third	Pole	483	826	11,325	986	199	25,605	38,115	1.71	79
		Stream	542	374	2,604	3,431	1,959	313	8,307	.69	15
		Total	1,025	1,200	13,929	4,417	2,158	25,918	46,422	1.17	45

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1945
MOUNT RAINIER NATIONAL PARK

Working	Class	Gross Acres	Net Acres	Effective Man-Days	Total Ribes	Per Acre Basis: Man-Days	Ribes
First	NP-Reg.	2,647	1,838	3,806	780,171	1.44	295
	NP-CCC	5,607	1,743	6,264	860,336	1.12	153
	Total	8,254	3,581	10,070	1,640,507	1.22	199
Second	NP-Reg.	766	766	569	19,395	.74	25
	NP-CCC	3,561	2,774	5,372	381,518	1.51	107
	Total	4,327	3,540	5,941	400,913	1.37	93
Third	NP-Reg.	4,939	4,939	4,984	149,886	1.01	30
	NP-CCC	1,792	1,572	1,056	51,313	.59	29
	Total	6,731	6,511	6,040	201,199	.90	30
All Workings	NP-Reg.	8,352	7,543	9,359	949,452	1.12	114
	NP-CCC	10,960	6,089	12,692	1,293,167	1.16	118
	Total	19,312	13,632	22,051	2,242,619	1.14	116

TABLE 5

SUMMARY OF RIBES ERADICATION, 1930-1945
MOUNT RAINIER NATIONAL PARK
(Net Control Area)

Working	Area	Eradication Type	Acres	Man-Days	Ribes Destroyed: Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triste	Total Ribes	Per Acre Basis: Man-Days	Per Acre Basis: Ribes
First	Longmire	Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192
		Stream	626	1,202	185,687		97,774		53,899	2,838	16		340,214	1.92	543
		Total	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.78	436
	White River	Reproduction	66	50	6,869	239	21	1,133	550	194			9,006	.76	136
		Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		Stream	423	744	162,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422
		Total	2,681	3,145	370,832	84,125	5,429	140,613	10,564	11,228	189	752	623,732	1.17	233
	All Areas	Reproduction	340	447	47,150	239	1,122	1,133	5,959	5,998			61,601	1.31	181
		Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		Stream	1,049	1,946	348,543	1,510	102,643	242	62,719	3,026	114	8	518,805	1.86	495
		Total	3,581	4,744	596,800	84,125	104,304	140,613	69,872	19,870	205	752	1,016,541	1.32	284
Second	Longmire	Reproduction	274	271	10,961		1,136			1,462			13,559	.99	49
		Stream	614	526	19,977		23,196		2,394	1,426	50		47,043	.86	77
		Total	888	797	30,938		24,332		2,394	2,888	50		60,602	.90	68
	White River	Reproduction	66	12	221			77					298	.18	5
		Pole	1,870	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.95	43
		Mature	322	47	1,278	2,011							3,289	.15	10
		Stream	394	657	32,748		154		5				32,907	1.67	84
		Total	2,652	2,484	70,531	16,315	2,330	6,941	16,229	4,537			116,883	.94	44
	All Areas	Reproduction	340	283	11,182		1,136	77		1,462			13,857	.83	41
		Pole	1,870	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.95	43
		Mature	322	47	1,278	2,011							3,289	.15	10
		Stream	1,008	1,183	52,725		23,350		2,399	1,426	50		79,950	1.17	79
		Total	3,540	3,281	101,469	16,315	26,662	6,941	18,623	7,425	50		177,485	.93	50
Third and Other	Longmire	Pole	1,046	2,190	29,129		2,739		458	41,187	9		73,522	2.09	70
		Stream	1,336	1,564	43,916		16,264		3,388	864	6		64,438	1.17	48
		Total	2,382	3,754	73,045		19,003		3,846	42,051	15		137,960	1.58	58
	White River	Pole	3,274	1,456	1,650	3,196		12,822	20	5,184			22,872	.44	7
		Stream	855	407	15,440	2,268	227		703	4			18,642	.48	22
		Total	4,129	1,863	17,090	5,464	227	12,822	723	5,188			41,514	.45	10
	All Areas	Pole	4,320	3,646	30,779	3,196	2,739	12,822	478	46,371	9		96,394	.84	22
		Stream	2,191	1,971	59,356	2,268	16,491		4,091	868	6		83,080	.90	38
		Total	6,511	5,617	90,135	5,464	19,230	12,822	4,569	47,239	15		179,474	.86	28
All Workings	Longmire	Reproduction	548	668	51,242		2,237		5,409	7,266			66,154	1.22	121
		Pole	1,046	2,190	29,129		2,739		458	41,187	9		73,522	2.09	70
		Stream	2,576	3,292	249,580		137,234		59,681	5,128	72		451,695	1.28	175
		Total	4,170	6,150	329,951		142,210		65,548	53,581	81		591,371	1.47	142
	White River	Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70
		Pole	7,014	5,311	211,714	87,029	2,715	158,924	17,433	20,522	91	744	499,172	.76	71
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		Stream	1,672	1,808	211,044	3,778	5,250	242	9,528	192	98	8	230,140	1.08	138
		Total	9,462	7,492	458,453	105,904	7,986	160,376	27,516	20,953	189	752	782,129	.79	83
	All Areas	Reproduction	680	730	58,332	239	2,258	1,210	5,959	7,460			75,458	1.07	111
		Pole	8,060	7,501	240,843	87,029	5,454	158,924	17,891	61,709	100	744	572,694	.93	71
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		Stream	4,248	5,100	460,624	3,778	142,484	242	69,209	5,320	170	8	681,835	1.20	161
		Total	13,632	13,642	788,404	105,904	150,196	160,376	93,064	74,534	270	752	1,373,500	1.00	101

BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1945

By

M. C. Riley, Operation Supervisor

The blister rust control program for the 1945 field season was a continuation of that initiated in 1939. Work was started on June 1, and continued until September 1 and consisted of second and third workings on the Park Headquarters area, second and third workings on the Lake McDonald area and first working on an extension of the original Lake McDonald area along Snyder Creek. The Park Headquarters area is located in unsurveyed secs. 25 and 26, T. 32 N., R. 19 W., Montana Meridian and the Lake McDonald work was in secs. 1, 2, 3, 10, 11, 12, 13, 14 and 23, T. 33 N., R. 18 W., Montana Meridian.

Work was conducted with one field crew of approximately twenty men from the Civilian Public Service camp and the performance of these assignees was satisfactory. An experienced foreman supervised the work. It was not possible to perform a systematic check on all of the worked area. Some strips were run on sample areas by a representative of the Bureau of Entomology and Plant Quarantine and this, coupled with random inspections, indicated that a good quality of work was done.

In July representatives of the Director's Office, the Regional Office, local Park Service officials and representatives of the Bureau of Entomology and Plant Quarantine visited the Snyder Creek area and decided to include this area in the Lake McDonald control unit. While it was not given any consideration when the original pre-eradication survey was made in Glacier National Park, there is a good stand of white pine of all age classes in association with other tree species. The trail to Sperry Glacier and Sperry Chalets passes through this area and it is one of the heavier visitor-use trails. This adjoins the original Lake McDonald unit and has now been made a part of it.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and organize the work. A representative also assisted in training the crew and getting the work started and later in the season did some checking work.

BLISTER RUST INFECTION

In previous seasons, blister rust has been found on the Lake McDonald and Two Medicine control units and on the Flathead River area which has never been considered in the general control area. During the past season blister rust infection was found on western white pine on the Park Headquarters control unit, on a small area along McDonald Creek approximately one-half mile above the mouth of Avalanche Creek, and on Fern Creek. The latter two locations are not in any control unit. Infection found on western white pine on the Park Headquarters area consisted of nine trees with one canker each. On the Lake McDonald unit a few additional cankers were found in the vicinity of the original infection. Very heavy infection exists on the McDonald Creek area and since this is immediately adjacent to the highway will serve as a good demonstration of damage to white pine when no control work is performed. Considerable infection was also located on the Fern Creek white pine. In both of these areas infection is so abundant that no control work is

contemplated. In all infection found thus far it is evident that initial infection occurred before any ribes eradication work was performed.

CONTROL STATUS

A complete regular check has not been performed on all of the areas worked during the past three years and this should be done as soon as possible so that the status of control on all areas can be definitely determined. However, sufficient sample checks and supervisory random inspections have been made to warrant rather general statements concerning all areas worked thus far. These may be subject to slight change on small patches of area when a check can be made.

Park Headquarters. First working was completed on this unit in 1939 and at present all necessary rework has been accomplished. Unless a check reveals resprouts in a few isolated areas such as in the vicinity of the Powder House, no additional work will be necessary on the upland area for at least five years. Practically all of the upland area can now be considered as being on a maintenance basis. Conditions along stream courses and in damp spots are considered as static at the present time except for a few small patches where *Ribes lacustre* seedlings may still be a problem. With the amount of infection now known to be present it is probable that none of this type of area will need working for about five years.

Two Medicine. The last work on this unit was performed in 1944. All initial work has been completed and rework has progressed according to schedule. Very light and widely scattered infection is known to exist here. A large portion of the upland is now on a maintenance basis. Exceptions are a comparatively small block of area on the rocky slope north of the campground, two small patches in the timber east of the campground and a small area at the southwest end of the protection zone. On all of the stream type, where heavy concentrations of ribes were previously removed, at least one more working will be required. Most of the lake shore is practically free of ribes now but a seedling problem exists in some of the stream type, especially in the vicinity of the east end of upper Two Medicine Lake. It is quite probable that two more workings will be necessary to place this portion of the stream type in a satisfactory condition.

Lake McDonald. First working was started on this area in 1939 and was completed in 1942 with the exception of the extension along Snyder Creek which was worked for the first time this season. Subsequent workings have been kept to schedule. The widely scattered infection appears to be very light. Very little future work will be necessary on upland types although some further work will be necessary in the northwest portion of the control unit and it is very probable that more work will be needed around the Lake McDonald Ranger Station and near the Lake McDonald Hotel where many service roads make openings in the timber stand. It is felt that no further work will be necessary in the upland types worked for the first time along Snyder Creek. While excellent work was done on Snyder Creek stream type this season, there was so much soil disturbance that undoubtedly further work will be needed here. This is also true of some stream type near the head of Lake McDonald,

especially the swamp area on the east side of the lake. Stream type along the remainder of the lake shore and along Sprague Creek appears to be in excellent condition.

East Glacier. Initial ribes eradication was started here in 1940 and was not completed until 1943, the next year in which any work was done on the area. Some second working was also done in 1943. While the work is behind schedule there is no known pine infection on this unit. Practically all of the upland type is approaching maintenance but some portions such as the cliff area west of the campground and along Roes Creek need further work. There is a definite seedling problem in some of the stream type which will probably require at least two more workings and all of the stream type will need one more working.

RECOMMENDATIONS

The following estimates are based upon ground conditions as they now exist according to the best knowledge, and naturally cannot take into consideration any ground disturbances such as those caused by fire, erosion, floods which change stream courses, road or trail construction and landscaping activities, all of which induce germination of ribes seed.

At Park Headquarters the work performed should suffice for a period of approximately five years when a crew of fifteen men for a period of one month should be able to do all work necessary in clearing up any bad spots revealed by a check and disease survey, which should be conducted in 1946. Probably another working will be needed at the end of another five years and it is estimated that this would require ten men for about a two week period.

The stream type along Snyder Creek on the Lake McDonald area will need another working in 1948 and other heavy stream type especially the swamp area near the head of Lake McDonald should also be covered. It is estimated that this would require the service of 15 men for one month. Portions of these same areas will need another working at the end of another three years and this would require 10 men for approximately one-half month. The last working for this unit would probably occur in about 10 years and would involve the services of 10 men for one-half month.

On the Two Medicine control unit 20 men will be needed for one month in 1947 to rework stream type and spots of upland where many ribes were removed in the previous work. Because of the seedling problem in the stream type it is felt that probably another working by 10 men for one month would be required in 1950. Then the area should be safe for another five years when final mop-up would again need 10 men for one month.

The East Glacier area is in about the same status. It is estimated that 20 men for two months in 1947, 10 men for one month in 1950 and 10 men for one month in 1955, would be necessary to remove the ribes from Roes Creek, the stream type along St. Mary Lake and the several cliff areas. There is a seedling problem on this unit which necessitates more workings than originally anticipated.

On all units where work has been done the problem is well under control. In spite of the light, scattered pine infection known to exist on some of the units, no trees are known to have been killed by blister rust thus far and it is reasonably certain that no appreciable loss will occur.

In the past few seasons there has been very little systematic checking work performed and disease survey work has not been adequate. To keep this work up to date in order to properly plan the attack and not cover area unnecessarily, two checkers should be employed in 1946. In future years one man for each year when ribes eradication is performed should be sufficient.

The above recommendations concern only those areas where ribes eradication work has already been done. It is proposed to initiate control work on the Oldman Lake unit in 1946 but until first working has been completed it is impractical to attempt estimates of the amount of future work necessary. In the light of information acquired and observations made regarding the susceptibility of the pine species present, and the width of protection strip necessary, the man-day estimates made in 1939 for the Oldman Lake area no longer apply. It is estimated that the equivalent of 30 men for two months, exclusive of camp building and training time, would be required for initial coverage of this area.

SUMMARY OF RECOMMENDATIONS AND ESTIMATES

Park Headquarters

1950 - 15 men for 1 month
1955 - 10 men for ½ month

Lake McDonald

1948 - 15 men for 1 month
1951 - 10 men for ½ month
1955 - 10 men for ½ month

Two Medicine

1947 - 20 men for 1 month
1950 - 10 men for 1 month
1955 - 10 men for 1 month

East Glacier

1947 - 20 men for 2 months
1950 - 10 men for 1 month
1955 - 10 men for 1 month

Oldman Lake

1946 - 30 men for 2 months
1949 - rework

Checker

1946 - 2 men for season. Thereafter one checker each year ribes eradication work is being done.

RESULTS

The following tables show statements of expenditures, results of the 1945 field work and accumulative results for all work performed to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
GLACIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$1,116.15
National Park Service	Regular BLR-5	944.32
Total		$2,060.47

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
GLACIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	$ 946.65	$937.30	$1,883.95
Travel and transp.	169.50		169.50
Supplies and material		7.02	7.02
Total	$1,116.15	$944.32	$2,060.47

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes setosum	Total Ribes	Per Acre Basis: Man-Days	Ribes
Park Headquarters	Second	Reproduction	96	8	1		4	5	.08	
		Pole	223	23	11		31	42	.10	
		All Types	319	31	12		35	47	.10	
	Third	Reproduction	134	70	446	143	161	750	.52	6
		Pole	127	190	1,716	3,535	903	6,154	1.50	48
		All Types	261	260	2,162	3,678	1,064	6,904	1.00	26
	All Workings	Reproduction	230	78	447	143	165	755	.34	3
		Pole	350	213	1,727	3,535	934	6,196	.61	18
		All Types	580	291	2,174	3,678	1,099	6,951	.50	12
Lake McDonald	First	Mature	320	10	48			48	.03	
		Stream	36	239	16,727	1		16,728	6.64	465
		All Types	356	249	16,775	1		16,776	.70	47
	Second	Mature	902	317	7,878	88	1,494	9,460	.35	10
		Stream	2	48	2,128	7	30	2,165	24.00	1,083
		All Types	904	365	10,006	95	1,524	11,625	.40	13
	Third	Mature	342	205	4,682	126	1,375	6,183	.60	18
	All Workings	Mature	1,564	532	12,608	214	2,869	15,691	.34	10
		Stream	38	287	18,855	8	30	18,893	7.55	497
		All Types	1,602	819	31,463	222	2,899	34,584	.51	22
All Areas	First	Mature	320	10	48			48	.03	
		Stream	36	239	16,727	1		16,728	6.64	465
		All Types	356	249	16,775	1		16,776	.70	47
	Second	Reproduction	96	8	1		4	5	.08	
		Pole	223	23	11		31	42	.10	
		Mature	902	317	7,878	88	1,494	9,460	.35	10
		Stream	2	48	2,128	7	30	2,165	24.00	1,083
		All Types	1,223	396	10,018	95	1,559	11,672	.32	10
	Third	Reproduction	134	70	446	143	161	750	.52	6
		Pole	127	190	1,716	3,535	903	6,154	1.50	48
		Mature	342	205	4,682	126	1,375	6,183	.60	18
		All Types	603	465	6,844	3,804	2,439	13,087	.77	22
	All Workings	Reproduction	230	78	447	143	165	755	.34	3
		Pole	350	213	1,727	3,535	934	6,196	.61	18
		Mature	1,564	532	12,608	214	2,869	15,691	.34	10
		Stream	38	287	18,855	8	30	18,893	7.55	497
		All Types	2,182	1,110	33,637	3,900	3,998	41,535	.51	19

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1939-1945
GLACIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis: Man-Days	Ribes
First	NP-Reg.	262	301	37,155	1.15	142
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	658	1,020	120,335	1.55	183
	Total	3,553	4,154	481,331	1.17	135
Second	NP-Reg.	731	763	122,606	1.04	168
	NP-CPS	1,471	684	57,016	.46	39
	Total	2,202	1,447	179,622	.66	82
Third	NP-CPS	647	581	36,805	.90	57
All Workings	NP-Reg.	993	1,064	159,761	1.07	161
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	2,776	2,285	214,156	.82	77
	Total	6,402	6,182	697,758	.97	109

TABLE 5

SUMMARY OF RIBES ERADICATION, 1939-1945
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes sestosum	Ribes inerme	Total Ribes	Per Acre Basis: Man-Days	Per Acre Basis: Ribes
Park Headquarters	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	284	122	13,428	15,364	8,967		37,759	.43	133
		Miscellaneous	39	119	9,411	21,340	8,353		39,104	3.05	1,003
		All Types	681	445	32,708	43,176	32,986		108,870	.55	160
	Second	Reproduction	230	47	2,877	581	562		4,020	.20	17
		Pole	350	102	387	964	566		1,917	.29	5
		Miscellaneous	39	52	13	973	67	2	1,055	1.33	27
		All Types	619	201	3,277	2,518	1,195	2	6,992	.32	11
	Third	Reproduction	134	70	446	143	161		750	.52	6
		Pole	127	190	1,716	3,535	903		6,154	1.50	48
		All Types	261	260	2,162	3,678	1,064		6,904	1.00	26
	All Workings	Reproduction	722	321	13,192	7,196	16,389		36,777	.44	51
		Pole	761	414	15,531	19,863	10,436		45,830	.54	60
		Miscellaneous	78	171	9,424	22,313	8,420	2	40,159	2.19	515
		All Types	1,561	906	38,147	49,372	35,245	2	122,766	.58	79
Two Medicine	First	Pole	593	645	40,145	2,705	1,723	8,646	53,219	1.09	90
		Miscellaneous	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		Stream	54	480	30,429	438		12,592	43,459	8.89	805
		All Types	707	1,243	74,509	4,193	6,388	23,072	108,162	1.76	153
	Second	Pole	252	181	15,716	1,332	4,562	5,874	27,484	.72	109
		Miscellaneous	16	20	1,495	67		2,471	4,033	1.25	252
		Stream	32	156	46,233	14		25,259	71,506	4.88	2,235
		All Types	300	357	63,444	1,413	4,562	33,604	103,023	1.19	343
	Third	Stream	44	116	11,230	32		12,456	23,718	2.64	539
	All Workings	Pole	845	826	55,861	4,037	6,285	14,520	80,703	.98	96
		Miscellaneous	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
		Stream	130	752	87,892	484		50,307	138,683	5.78	1,067
		All Types	1,051	1,716	149,183	5,638	10,950	69,132	234,903	1.63	224
Lake McDonald	First	Mature	1,730	923	21,125	4,253	34,175		59,553	.53	34
		Stream	47	278	21,911	36	1,602		23,549	5.91	501
		All Types	1,777	1,201	43,036	4,289	35,777		83,102	.68	47
	Second	Mature	1,184	620	11,051	1,393	17,490		29,934	.52	25
		Stream	13	69	3,126	137	1,324		4,587	5.31	353
		All Types	1,197	689	14,177	1,530	18,814		34,521	.58	29
	Third	Mature	342	205	4,682	126	1,375		6,183	.60	18
	All Workings	Mature	3,256	1,748	36,858	5,772	53,040		95,670	.54	29
		Stream	60	347	25,037	173	2,926		28,136	5.78	469
		All Types	3,316	2,095	61,895	5,945	55,966		123,806	.63	37
East Glacier	First	Pole	367	1,005	44,305	14,739	11,042	65,936	136,022	2.74	371
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	388	1,265	44,376	14,897	11,042	110,882	181,197	3.26	467
	Second	Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
	All Workings	Pole	453	1,205	66,121	17,231	20,549	67,207	171,108	2.66	378
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	474	1,465	66,192	17,389	20,549	112,153	216,283	3.09	456
All Areas	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	1,244	1,772	97,878	32,808	21,732	74,582	227,000	1.42	182
		Mature	1,730	923	21,125	4,253	34,175		59,553	.53	34
		Miscellaneous	99	237	13,346	22,390	13,018	1,834	50,588	2.39	511
		Stream	122	1,018	52,411	632	1,602	57,538	112,183	8.34	920
		All Types	3,553	4,154	194,629	66,555	86,193	133,954	481,331	1.17	135
	Second	Reproduction	230	47	2,877	581	562		4,020	.20	17
		Pole	688	483	37,919	4,788	14,635	7,145	64,487	.70	94
		Mature	1,184	620	11,051	1,393	17,490		29,934	.52	25
		Miscellaneous	55	72	1,508	1,040	67	2,473	5,088	1.31	93
		Stream	45	225	49,359	151	1,324	25,259	76,093	5.00	1,691
		All Types	2,202	1,447	102,714	7,953	34,078	34,877	179,622	.66	82
	Third	Reproduction	134	70	446	143	161		750	.52	6
		Pole	127	190	1,716	3,535	903		6,154	1.50	48
		Mature	342	205	4,682	126	1,375		6,183	.60	18
		Stream	44	116	11,230	32		12,456	23,718	2.64	539
		All Types	647	581	18,074	3,836	2,439	12,456	36,805	.90	57
	All Workings	Reproduction	722	321	13,192	7,196	16,389		36,777	.44	51
		Pole	2,059	2,445	137,513	41,131	37,270	81,727	297,641	1.19	145
		Mature	3,256	1,748	36,858	5,772	53,040		95,670	.54	29
		Miscellaneous	154	309	14,854	23,430	13,085	4,307	55,676	2.01	362
		Stream	211	1,359	113,000	815	2,926	95,253	211,994	6.44	1,005
		All Types	6,402	6,182	315,417	78,344	122,710	181,287	697,758	.97	109

BLISTER RUST CONTROL, YELLOWSTONE NATIONAL PARK, 1945

By

M. C. Riley, Operation Supervisor

C. M. Chapman, Pathologist

Following the finding of blister rust infection on Ribes petiolare at Clematis Gulch in the Mammoth control unit during the fall of 1944, ribes eradication for the control of white pine blister rust was initiated in Yellowstone National Park during the field season of 1945. Work started on June 18 and ended on September 14. The field crew consisted of a maximum of 20 men assigned to the Yellowstone side camp from the Civilian Public Service camp at Glacier National Park.

First working was performed on the Mammoth unit and this involved hand eradication, chemical spraying of R. petiolare in stream type using ammonium sulfamate in solution and the chemical treatment of decapitated bushes which were rock-bound. Initial working was completed on the pine area itself but there still remains some spraying work to be done in the protection zone. This could have been completed and additional needed mop-up could have been performed if the crew had spent the entire field season on ribes eradication. However, because of time spent on fire in Glacier National Park and time spent on construction of the Purple Mountain trail, the programmed work was not completed.

Some special problems were encountered which added somewhat to the man-day cost. Great care had to be exercised, in working around buildings and landscaped areas in order not to disturb or destroy other vegetation than ribes. This decreased normal man-day output in both hand and chemical work. In working around the administrative area it was necessary to dispose of pulled bushes and string lines.

All worked area was given a systematic 4 percent check except the stream type on Glen Creek and a small patch of upland area at the south end of the protection zone. This unchecked area was worked at the end of the season and time did not permit making the check. In general, satisfactory work was done. Some small patches of area have too many ribes remaining, especially on the south side of the control unit and in and adjacent to the crater holes. Some portions of the area where heavy concentrations of ribes were removed will undoubtedly produce many seedlings and will need reworking at some future date.

No experienced blister rust foreman was available and prior to the securing of an additional foreman only mediocre supervision was supplied. This, plus a decided lack of interest on the part of a majority of the Civilian Public Service assignees, made it necessary to perform more mop-up than is usually necessary.

No blister rust infection has been found on the white pine in Yellowstone National Park although considerable time was spent in examining the pine on the Mammoth control unit this past season. Additional blister rust infection was found on R. petiolare in Clematis Gulch and new ribes infection locations on R. petiolare and R. setosum were discovered on Glen Creek above the old road

crossing. The determination was made by the Division of Forest Pathology, U. S. Department of Agriculture.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and organize the work and assisted in training the crew. A representative of the Bureau, who remained on the work for practically the duration of the project, gave technical assistance in locating boundaries, checking the work and scouting for white pine blister rust infection. Funds from a regular National Park Service appropriation were used to employ foremen and to cover expenditures for supplies and equipment.

RECOMMENDATIONS

The remaining first working on the Mammoth control unit should be completed in 1946. This can readily be done in conjunction with, and as a forerunner to, the proposed ribes eradication work on the Mt. Washburn control unit. It is anticipated that many ribes seedlings will appear on the parts of the area where heavy ribes concentrations were removed, but definite recommendations as to where additional work would be feasible should be deferred until more opportunity is afforded to appraise the amount of rework necessary.

It has been recommended that ribes eradication be initiated on the Mt. Washburn unit in 1946 if funds are available. Because of the hazardous nature of some of the terrain and the probable scarcity of adequate supervisory personnel it is felt that a crew of 30 men in the field is all that should be used. With this size crew it will probably require two field seasons to accomplish initial working because of difficult working conditions, a comparatively short working season due to late snows, and the fact that it is advisable to extend the protection zone beyond that originally contemplated.

RESULTS

The following tables show statements of expenditures and results of the 1945 field work.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
YELLOWSTONE NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$1,640.70
National Park Service	Regular BLR-5	5,718.93
Total		$7,359.63

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
YELLOWSTONE NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine Regular BLR-1-4	National Park Service Regular BLR-5	Total
Sal. perm. men	$1,255.03		$1,255.03
Personal services		$1,548.97	1,548.97
Travel & transp.	385.67	854.41	1,240.08
Transp. of things		14.09	14.09
Supplies & materials		3,209.25	3,209.25
Equipment		92.21	92.21
Total	$1,640.70	$5,718.93	$7,359.63

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
YELLOWSTONE NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species					Total Ribes	Gallons Spray	Per Acre Basis		
					Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes setosum	Ribes cereum			Man-Days	Ribes	Gallons
Mammoth	First	Mature	1,562	913	4,132	2,329		62,720	12,211	81,392		.58	52	
		Stream	5	79	4,190	2	9,900	281	4	14,377	765	15.80	2,875	153
		All Types	1,567	992	8,322	2,331	9,900	63,001	12,215	95,769		.63	61	

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION, AND PROGRESS OF RIBES ECOLOGY AND DISEASE CONTROL STUDIES IN THE NORTHWESTERN REGION FOR 1945

By

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FOREWORD

Activities of the developmental and improvement project BLR-1-6 for the calendar year of 1945 have included office, laboratory, greenhouse and field work. The present annual report, as in past years, is primarily devoted to a discussion on field work. Only a brief statement (Section III) is given of activities other than field work. Section II presents details of the plot data secured during 1945. Section I is a status report on the various field studies in methods of ribes eradication, ribes ecology, and disease control investigations currently in progress. Attention is called to the recommendations for chemical eradication of ribes in Table 7 of the report in Section II on improvement of chemical methods for ribes eradication. Of special interest is the recommendation of Dow Endoweed (2,4-dichlorophenoxyacetic acid) for chemical spray treatment of Ribes petiolare. In the detailed report on the ecology of ribes occurring in Section II, results of first inspection for ribes seed germination from the disturbance plots are given. This study is providing valuable information in the length of time ribes seed will remain viable following alteration of the seed storage environment by removal of part or all the timber canopy in logging. The report on disease control studies includes an index on conditions for pine infection in 1945, and a summary report of the pruning and inspection work undertaken on the Powder House plot during the current season. A special report on the Powder House plot will be issued early in 1946.

I. SUMMARY

A. Tests of Ammonium Sulfamate and 2,4-Dichlorophenoxyacetic Acid for Ribes Eradication

1. Status of work. Field tests of ammonium sulfamate applied in 1943 and 1944 were inspected for effectiveness of kill in 1945. From the results, recommended dosages were established for practical field applications beginning with the current season.

   A new herbicide, 2,4-dichlorophenoxyacetic acid, was tested in the field for the first time in 1945. This chemical is a plant growth hormone type of weed killer of high ecologic and plant species selectivity. Field tests in Idaho were made on Ribes viscosissimum and upland-type R. lacustre at the source of LaClerc Creek, Kaniksu Forest, and on R. petiolare and R. inerme along the St. Maries River near Fernwood, Idaho. In Wyoming, field tests were made on R. montigenum.

Results to date have shown R. petiolare to be the only species of ribes definitely susceptible to the new chemical. Ribes lacustre and R. montigenum are definitely not susceptible. Ribes inerme and R. viscosissimum are in the doubtful category and the results of examinations next spring

must be awaited before preliminary conclusions can be drawn. Investigations are in progress this winter at Berkeley to modify the 2,4-D spray or to develop other chemicals of similar properties in order to obtain low cost herbicides that will be effective on all ribes.

B. Grazing of Sheep on Cut-over Lands in Relation to the Regeneration and Growth of Ribes and Western White Pine

1. Status of Work. Four studies are in progress on problems relating to grazing of sheep and control of the rust on cut-over lands in the white pine type, namely: (a) Effects of normal grazing of recent cut-over lands on the germination, growth and development of ribes and western white pine seedlings, (b) Effects of deferred grazing on . . . . seedlings, (c) Effects of controlled grazing on . . . . seedlings, and (d) Effects of continuous seasonal grazing of old logged and burned-over lands on the regeneration of ribes and western white pine seedlings.

With the curtailment of research activities during the war period, it was necessary to defer considerable work on these studies in preference to concentrating on problems of cutting practices. Except for maintenance of the fenced exclosures and of the grazing schedules and inspection for new ribes and pine germination, no further work was undertaken this season. A five-year study program, the original objective, was completed in 1944 with removal of all ribes from the plots. There remain as objectives in the continuation of these grazing studies: observations on new ribes germination, survival, development and new germination of white pine seedlings, similar data for associated coniferous species, and the comparative conditions of grazed and ungrazed areas as related to the problem of travel and search in ribes eradication.

Since complete examinations of the grazing plots were not made this season, no discussions are presented in the section on field work. However, a brief resume of important conclusions is presented in this summary section for each grazing study.

(a) The effects of normal grazing by sheep of recent cut-over lands on the germination, growth and development of ribes and western white pine seedlings have shown the following facts of importance to the rust control operations.

(1) Dwarfed or stunted ribes are not a result of grazing except along driveways and on bedding grounds where overgrazing is a common practice.

(2) Grazing of recent cut-over lands does not add to the problem of new ribes germination but actually decreases their numbers.

(3) Searching for ribes is made less difficult on areas subjected to grazing, providing eradication work procedes grazing in any one year.

(4) Germination of white pine seed is materially increased on areas subjected to the grazing disturbance with practically no loss of seedlings on slopes under 40 percent grade.

(b) The deferment of grazing from older cut-over lands until satisfactory control standards can be established generally showed results unfavorable to effective control work.

(1) All subdominant vegetation responded in density and height-growth, making difficult the searching for ribes in a compact cover.

(2) Growth of ribes was in proportion to growth of other plant associates.

(3) Rodent activity increased and was responsible for new ribes germination on areas deferred from grazing.

(4) The number of new white pine seedlings was considerably less on deferred areas.

(c) Controlling the intensity of grazing by construction of enclosures made possible comparisons of intensities of grazing.

(1) Moderate grazing at the rate of 21 acres per animal unit had no appreciable influence on ribes or white pine seedlings.

(2) On slopes greater than 40 percent in grade grazing at the rate of 14 acres per animal unit resulted in ribes seed germination and rather severe loss of white pine seedlings.

(d) Continuous seasonal grazing of old logged and burned-over lands has for the most part favored ribes eradication.

(1) Brush cover has remained more open, a material aid in travel and search for ribes.

(2) New ribes germination has been at a minimum because of heavy sodding.

(3) White pine seedlings have continued to germinate and become established in spite of the sod.

C. Ecological Studies of Ribes and Western White Pine

1. Status of work. Investigations were continued the past season on the following problems: a. The effects of variable light and moisture conditions on the germination, growth and development of *R. viscosissimum*, *R. lacustre* and *Pinus monticola*. b. Longevity of ribes seeds as affected by alteration of the storage environment resulting from cutting of mature timber. c. Slash disposal measures and their influence upon the regeneration and development of ribes and white pine

seedlings. d. Stand improvement practices in relation to the ecological development of ribes. e. The predetermination of potential ribes populations in stands of mature timber as a factor in forest management practices. f. Direct seeding of conditioned white pine seed.

(a) The study of variable light and moisture conditions on germination, growth and development of upland ribes and white pine seedlings was established under light intensities of full sun, half shade, and full shade environments. At each light station seeds of ribes and white pine were sown on natural duff, mineral and burnt-mineral soil surfaces. Continuous observations over a period of 5 years have shown, in addition to facts previously reported in the 1941 to 1944 annual reports, the following conclusions:

(1) Longevity of ribes seeds is dependent upon soil moisture-soil temperature relationships in the seed-storage environment. Highly significant is the fact that a drastic alteration of the seed-storage environment as through cutting of timber results in devitalization of ribes seeds. The cut must be so regulated as to produce the desired environmental change in the organic mantle, and yet maintain sufficient canopy shade to suppress the majority of ribes seedlings originating as a result of the disturbance.

(2) Through a gradual sifting process, resulting from the action of water, wind, and animal activity, ribes seeds soon become too deeply buried in the soil medium for germination. Unless favorable soil temperature-soil moisture conditions prevail ribes seeds within the storage environment soon lose viability and are no longer a factor in the problem of new germination.

(b) Longevity of ribes seeds is dependent upon the favorableness of the seed-storage environment. This infers a relative constant environment of low soil temperature, soil moist at all times, and no appreciable exchange of soil gases. When one or more of these conditions are altered, the resultant effect upon ribes seeds is either germination or a reduction in viability. It is the purpose of this study to determine how the longevity of ribes seed is related to the time factor (number of years succeeding a disturbance) and to an alteration of the seed-storage environment. Interest primarily centers around the question whether stored ribes seed undisturbed mechanically by logging will continue to represent a potential population upon some later disturbance. If data continue to be as encouraging as those recorded this season from the five disturbance plots, a considerable reduction in ribes populations through devitalization of stored seed should be possible by regulating the intensity and number of cuts in stands of merchantable size.

(c) Studies of slash disposal measures were continued in cooperation with the Forest Service, Potlatch Forests, Inc., and the Slash Disposal Committee of the Inland Empire Section, Society of American Foresters. Few actual plot inspections were possible under the curtailed program. Those examined gave positive proof that partial

disposal measures materially aid in the reduction of ribes regeneration on newly cut-over lands. Besides the reduction in numbers of ribes, their distribution is limited to roadways, skid trails, and fire breaks.

(d) Ribes ecological studies relating to stand improvement practices in the western white pine type were currently continued in cooperation with Timber Management and the Northern Rocky Mountain Forest and Range Experiment Station, Forest Service. Considerable emphasis was placed this past season on evaluation of potential ribes problems in relation to cutting practices. Three major blocks of mature timber were carefully studied in view of potential ribes, mountain pine beetle, and silvicultural aspects. These units were the Lost Block and Steamboat areas on the Coeur d'Alene National Forest, and the Sheep Mountain sale on the Clearwater National Forest. Many other areas were inspected either for the purpose of agreeing upon cutting practices or in connection with timber management inspection trips.

(e) Ribes control problems currently arise from the vast acreage of mature timber cuttings. The degree to which these problems are made difficult is dependent upon forest practice methods. Forest practice methods must proceed judiciously, for management can no longer disregard the problems of rust control and expect sound silvicultural objectives to be realized. As cutting operations are responsible for new ribes populations, it is management's responsibility to adopt sound forestry methods resulting in the least possible control problem. The solution is at hand if the silvicultural objective is white pine of an equal or greater proportion than the stand harvested. The answer is the adaptation of forest practices based on the silvicultural and economic aspects of a stand with minimum disposal of slash. When this is done the problem of blister rust control will be decidedly reduced to a minimum.

In order for timber management to take advantage of ribes-free and light ribes potentials on areas in regulating the degree of cut, it is necessary to predetermine potential ribes populations before cutting practices are agreed upon. It is the purpose of this study to evaluate and systematize procedures for this work. The method incorporates six divisions of information, namely:

1. Inspection for ribes, established or newly germinated in openings, moist sites, along game trails, rodent mounds, etc.

2. Fire history of area (single or multiple) in relation to exposures.

3. Ecology of stand, origin, composition, age, etc.

4. Subdominant vegetation, compatibility of brushy and herbaceous plants with ribes.

5. Edaphics of soil profile in respect to favorableness of seed-storage environment.

6. Screening and recovery of ribes seeds on a unit basis of area.

Step 6 is primarily employed for the determination of seed viability.

(f) Direct seeding activities were temporarily curtailed for lack of a 1944 seed crop. This season (1945) adequate seed was obtained for an extensive study next spring. Process for conditioning seed has been worked out and principles of a seed-cracker critically tested. The mechanism will be constructed this winter. Spot and broadcast sowings will be made on the Diamond Creek burn, Kaniksu Forest early next spring.

D. Disease Control Plot Studies

1. Status of work. During the past season, as in previous years, blister rust disease behavior on ribes was observed in relation to the probable infection of western white pine throughout the region. Routine maintenance work was conducted on existing plot studies with some new work inaugurated. One new study was a disease survey undertaken to determine the amount of pine infection bordering the Powder House plot on the Clearwater National Forest in comparison to the average amount of pine infection within the plot. The majority of the season's work was devoted to the establishment of a pruning study of white pine on the Powder House plot. The purpose of this study is to determine the practicability of salvaging blister rust infected white pine stands through pruning procedures.

An inspection of permanent blister rust plots in northern Idaho showed the development of the rust on ribes to be comparable to the 1944 season. It was also observed that the intensification of the rust on ribes increased toward the southern portion of the region. During the dates between September 15 to 17 and September 20 to 26 conditions for pine infection were favorable since both periods were relatively cool and moist. Seasonal examinations of pine have shown but little if any infection occurring since 1941. The disease survey of pine bordering the Powder House plot showed a slightly high average percentage of infection than on the plot itself. The report of the Bureau-Forest Service cooperative study of pruning is principally devoted to a discussion of methods and problems encountered. This study will be made the subject of a special report in the future.

II. FIELD WORK

IMPROVEMENT OF CHEMICAL METHODS FOR RIBES ERADICATION

Results of 1944 Tests

Ammonium sulfamate in the form of DuPont's Ammate (80% by weight of ammonium sulfamate, $NH_4SO_3NH_2$) was the only chemical tested in the field during 1944.

Plots on stream type Ribes lacustre at Crystal Creek, St. Joe National Forest, and LaClerc Creek, Kaniksu National Forest, were observed several times during the season of 1945 and were given a final check in September 1945. Results of this check, as shown in Tables 1 and 2, confirm the previous results (1944 annual report) regarding the effectiveness of sulfamate in killing stream-type R. lacustre. Data also show that spring and fall applications of sulfamate on R. lacustre tend to be more effective than midseason applications. Some seedlings of 1945 origin were found on the Crystal Creek plots (see column 6 of Table 1), thus indicating that the sulfamate has only a temporary poisoning action on the soil especially in alluvial stream bottom where considerable leaching and washing may occur over winter and spring months.

The plots at LaClerc Creek were primarily R. viscosissimum plots. Results on the upland R. lacustre are incidental to the experimental design of the plots because of small numbers of bushes and unequal distribution among the several dosages. Ribes viscosissimum can apparently be killed by sulfamate, but the lethal dosage of the chemical is greater than for stream-type R. lacustre. Also the spring applications on R. viscosissimum resulted in generally better kill than the fall applications.

Results of the semipractical spray test of sulfamate on large rockbound R. lacustre (and R. viscosissimum) were encouraging. These bushes (located above the road in the first draw on the Idaho side of LaClerc Creek) were large, multiple-rooted, and would have been costly and troublesome to eradicate by grubbing. Only two feeble sprouts were found among the nine clumps of R. lacustre and R. viscosissimum when the bushes were checked this year. Treatment was by Ammate (1 lb. per gallon) applied at the dosage rate of about 2 lbs. per milacre.

TABLE 1

RESULTS OF 1944 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE ON RIBES LACUSTRE, CRYSTAL CREEK, ST. JOE NATIONAL FOREST, IDAHO

Plot No.	Per Milacre				No. of Surviving Bushes 6/	Percent Kill of Live Stem 7/
	Percent of Plot Occupied by Ribes	Feet of Live Stem	Lbs. of Chemical	Gals. of Water		
Spring series 1/						
7	30	350	2	2	0	100
8	20	200	1	2	0	100
9	60	600	3	3	0	100
10	40	600	4	4	0	100
11	20	200	1/2	1	2	99 (3)
12	50	500	6	6	0	100
Summer series 2/						
13	75	1,050	1/2	1	1 (1)	99 (8)
14	55	875	1	2	0 (8)	100
15	40	650	2	2	0 (5)	100
16	60	950	3	3	0 (1)	100
17	40	575	4	4	2	98 (9)
18	60	700	6	6	0 (1)	100
Fall series 3/						
19	40	450	6	6	0 (3)	100
20	30	325	2	2	0	100
21	40	350	3	3	0	100
22	25	250	1	2	0	100
23 4/	15	175	1/2	1	3	92 (12)
24 5/	40	400	4	4	0	100

1/ Applied June 10; 2/ applied July 18; 3/ applied September 5.
4/ Also R. petiolare (60 FLS). 99% live stem kill (1 surviving plant).
5/ Also R. petiolare (25 FLS). All plants dead in 1945.
6/ Numbers in parenthesis show number of R. lacustre seedlings of 1945 origin.
7/ Numbers in parenthesis show surviving live stem (FLS).

TABLE 2

RESULTS OF 1944 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE ON RIBES VISCOSISSIMUM AND UPLAND R. LACUSTRE, LACLERC DRAINAGE, KANIKSU NATIONAL FOREST, IDAHO

Plot No.	Per Milacre				Percent Kill	
	No. of Bushes	Feet of Live Stem	Lbs. of Chemical	Gals. of Water	Bushes 3/	Live Stem 4/
Spring series 1/						
1	29 V.	232			100	100
	1 L.	8	4	4	100	100
2	37 V.	240			97 (1)	99 (2)
	1 L.	4	2	2	100	100
3	43 V.	250			98 (1)	99 (1)
	1 L.	7	1	1	100	100
4	34 V.	272			82 (6)	97 (7)
	2 L.	40	1/2	1	0 (2)	75 (10)
Fall series 2/						
5	26 V.	425			77 (6)	96 (17)
	1 L.	25	4	4	100	100
6	14 V.	125			64 (5)	84 (20)
	17 L.	225	3	3	94 (1)	99 (1)
7	18 V.	275	6	6	100	100

1/ Applied June 14; 2/ applied September 9.
3/ Numbers in parenthesis show number of surviving bushes.
4/ Numbers in parenthesis show surviving live stem in feet.

New Herbicides Tested in 1945

The plant growth hormone type of weed killer was tested on ribes in the field for the first time in 1945. 2,4-dichlorophenoxyacetic acid was the only hormone available in commercial quantity, and field tests were confined to this chemical in one or other of its soluble forms. The acid is relatively insoluble in water and must be converted to a soluble salt by adding dilute alkali or carbonate or by forming the soap or ester with other organics such as polyethylene glycol (Carbowax) or triethanolamine. Data given in Tables 3, 4, 5, and 6 summarize the field tests made with 2,4-D on R. lacustre, R. inerme, R. petiolare, R. viscosissimum, and R. montigenum.

The unusual properties of 2,4-D and related compounds and the variables to be considered in evaluating them for ribes eradication will be presented in a special report at a later date. For the present it is sufficient to point out that the high selectivity of 2,4-D has been confirmed by tests on ribes. Ribes petiolare is definitely susceptible. Ribes lacustre and R. montigenum are definitely not susceptible. Ribes inerme and R. viscosissimum are in the doubtful category and the results of next spring must be awaited before preliminary conclusions can be drawn. Investigations are now in progress to modify the 2,4-D spray or to develop other chemicals of similar properties in order to obtain herbicides that will be effective on all ribes.

TABLE 3

1945 SPRAY AND SOIL DRENCH TESTS OF 2,4-D ON R. VISCOSISSIMUM AND UPLAND R. LACUSTRE, LACLERC CREEK PLOTS, KANIKSU NATIONAL FOREST, IDAHO

Plot No. and Date Treated		Composition and Concentration of 2,4-D Solution	Per Milacre: Gals. Solution	No. of Bushes	Feet Live Stem	Percent Ground Occupied by Ribes
6/14	9	2,4-D 70% Dow Na Salt 1.43 oz. in 10 gals. water plus Tergitol #7 1/		8 V.	200	
			4	1 L.	20	35
	10		3	34 V.	200	
				12 L.	30	50
	11		1	9 V.	90	
				7 L.	110	35
	12			21 V.	250	
			2	2 L.	5	40
	13	2,4-D 60% Dow Na Salt 1.67 oz. in 10 gals. water plus dilute NH_4OH to dissolve residue plus Tergitol #7		13 V.	125	
			3	5 L.	80	30
	14			14 V.	115	
			4	12 L.	140	40
	15			25 V.	150	
			2	4 L.	60	25
	16		1	21 V.	250	35
8/10	17	2,4-D 70% Dow Na Salt 1.43 oz. in 5 gals. water plus Tergitol #7		30 V.	120	
			3	11 L.	50	40
	18			32 V.	175	
			2	2 L.	15	45
	19	2,4-D 100% acid in 1% Carbowax 1.0 oz. in 10 gals. water plus Tergitol #7	4	33 V.	180	30
	20			24 V.	100	20
			1	2 L.	10	
	21			29 V.	200	
			3	1 L.	10	25
	22		2	23 V.	280	30
9/10	23	2,4-D 60% Dow Na Salt 1.67 oz. in 6 gals. water plus furfural (4 tablesp.) plus Tergitol	1	23 V.	300	40
	24		2	24 V.	270	40
	25			31 V.	300	
			3	1 L.	5	50
	25a		2 2/	36 V.	200	30

1/ In this and in all other tests Tergitol was used at the rate of about 1 tablespoonful for each 10 gallons of solution.

2/ Same chemicals used but 1/4 strength.

TABLE 4

1945 SPRAY AND SOIL DRENCH TESTS OF 2,4-D ON *R. LACUSTRE*, LACLERC CREEK PLOTS, KANIKSU NATIONAL FOREST, IDAHO

Plot No. and Date Treated		Composition and Concentration of 2,4-D Solution	Per Milacre			
			Gals. Solution	No. of Bushes	Feet Live Stem	Percent Ground Occupied by Ribes
6/13	1	2,4-D 100% acid in 1% Carbowax	2	9	450	75
	2	1.0 oz. in 10 gals. water	3	8	450	75
	3	plus Tergitol #7	1	15	400	85
	4a			6	125	50
	4b		4	5	175	60
6/15	5	2,4-D 70% Dow Na Salt	1	4	350	50
	6	1.43 oz. in 10 gals. water	3	4	600	80
	7	plus Tergitol #7	4	4	700	85
	8		2	7	700	80
8/9	17a	2,4-D 100% acid in 1% Carbowax	1	9	450	85
	18a	1.0 oz. in 10 gals. water	2	7	400	80
	19a	plus Tergitol #7	4	5	500	90
	20a 1/		3	4	400	90
	21a	2,4-D 70% Dow Na Salt	3	5	700	95
	22a	1.43 oz. in 5 gals. water plus Tergitol #7	2	6	600	85
9/10	26	2,4-D 60% Dow Na Salt	2 2/	6	350	35
	27	1.67 oz. in 8 gals. water	3	5	500	80
	28	plus furfural (4 tablespoons) plus Tergitol #7	2	14	450	70

1/ On this plot there were also 2 *R. viscosissimum* having 150 F.L.S.
2/ Same chemicals used but 1/4 strength.

TABLE 5

1945 SPRAY AND SOIL DRENCH TESTS OF 2,4-D ON R. PETIOLARE AND R. INERME, FERNWOOD BRIDGE PLOTS, ST. JOE NATIONAL FOREST, IDAHO

Plot No. and Date Treated		Composition and Concentration of 2,4-D Solution	Per Milacre			
			Gals. Solution	No. of Bushes	Feet Live Stem	Percent Ground Occupied By Ribes
6/22	1	2,4-D 70% Dow Na Salt		9 P.	300	
		1.43 oz. in 10 gals. water	4	2 I.	25	90
	2	plus Tergitol #7	1	12 P.	300	80
	3			4 P.	60	
			3	5 I.	50	20
	4		2	10 P.	200	40
	5	2,4-D 60% Dow Na Salt	2	12 P.	250	50
	6	1.67 oz. in 10 gals. water	1	14 P.	300	70
	7	plus dilute NH_4OH to dissolve	4	5 P.	275	75
	8	residue, plus Tergitol #7	3	6 P.	350	90
8/3	9	2,4-D 100% acid in 1% Carbowax	2	8 P.	250	40
	10	1.0 oz. in 10 gals. water	1	9 P.	350	65
	11	plus Tergitol #7	4	10 P.	300	50
	15		3	6 I.	150	30
	12	2,4-D 70% Dow Na Salt	1	8 P.	250	40
	13	1.43 oz. in 10 gals. water	4	9 P.	200	30
	14	plus Tergitol #7	2	10 P.	350	60
	16		3	8 I.	175	40
9/12	17	2,4-D 60% Dow Na Salt	2 1/	10 P.	250	70
	18	1.67 oz. in 6 gals. water	2	8 P.	300	80
	19	plus Tergitol #7	3	8 P.	275	80
	20	2,4-D 60% Dow Na Salt	1	4 I.	175	40
	21	1.67 oz. in 6 gals. water	2	10 I.	150	30
	22	plus furfural (4 tablespoons) plus Tergitol #7	3	7 I.	150	30

1/ Same chemicals but 1/4 strength.

TABLE 6

1945 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE AND 2,4-D CHEMICALS ON R. MONTIGENUM, MT. WASHBURN, YELLOWSTONE NATIONAL PARK, WYOMING

Plot No. and Date Treated		Chemical Composition and Concentration of Solution	Square Footage of Area Treated	Gals. of Solution
8/23	1	Ammonium sulfamate (DuPont's Ammate),	25	1/
	2	10 lbs. in 10 gals. of water plus	4	
	3	Tergitol #7 (1 tablespoon).	48	
	4		48	10
	5		12	gals.
	6		144	total
	7		4	
	8		8	
	9		64	
7/25	1	2,4-D, 70% Dow Na Salt	43.56	1
	2	1.43 oz. in 10 gals. of water plus	43.56	2
	3	Tergitol #7 (1 tablespoon)	43.56	3
	4		43.56	4
9/1	5	2,4-D, 70% Dow Na Salt	43.56	1
	6	1.43 oz. in 10 gals. of water plus	43.56	2
	7	Tergitol #7 (1 tablespoon)	43.56	3
	8		43.56	4

1/ 10 gallons of solution was applied to individual clumps of R. montigenum representing a total combined area of 357 square feet of growing space.

STATUS OF RECOMMENDATIONS FOR THE CHEMICAL ERADICATION OF RIBES

Recent developments and testing of new chemicals for use in ribes eradication have reached the point where recommendations can be made for practical spray work. The new chemicals should be tested in operations work by limited use under the several ecologic and soil conditions encountered throughout the region. The principal objectives of setting down these recommendations is to acquaint all blister rust supervisors with the established facts relating to the effectiveness of the new herbicides so that proper consideration can be given to them in planning the eradication work for the 1946 field season. Ammonium sulfamate and 2,4-D appear to have advantages in cost, effectiveness or bulk over Atlacide (Chlorates) for regular spray work in the following situations:

(1) Ammonium sulfamate (DuPont Ammate) for work on a single species of Ribes lacustre, R. inerme, or R. viscosissimum, or any combination of these three with R. petiolare where it is impractical to spray R. petiolare in a special operation. This recommendation applies either to initial or rework with the usual reservations about number of bushes and availability of water.

(2) 2,4-D (Dow sodium salt 60%, called Endoweed) for work on R. petiolare either initial or rework where it occurs as a single species.

Status of recommendations of dosage and treatment is summarized in Table 7.

TABLE 7

RECOMMENDATIONS ON THE USE OF NEW HERBICIDES FOR PRACTICAL RIBES ERADICATION WORK IN THE NORTHWESTERN REGION1/

(Summarizes best information available through the fall of 1945)

Common Name of Chemical	Grade or Type to be Purchased for Field Use	Ribes Species	Dosage per Milacre2/
Sulfamate	DuPont's Ammate (contains 80% by weight of ammonium sulfamate plus inert materials)	R. lacustre (stream)	1.0 lb. Ammate
		R. lacustre (upland)	1.5 lbs. Ammate
		R. petiolare (stream)	1.0 lb. Ammate
		R. inerme (stream)	2.0 lbs. Ammate
		R. viscosissimum	2.0 lbs. Ammate
2,4-D	Dow Endoweed (contains 60% by weight of the sodium salt of 2,4-D acid plus wetting agent plus inert materials)	R. petiolare (stream)	1 gal. of soln. containing 0.08% (800 p.p.m.) of 2,4-D acid. For the Endoweed this is 1 gal. of soln. from a batch made by dissolving 1.67 oz. of dry powder in 10 gals. water.

1/ Instructions for practical work: Dissolve Ammate at rate of 1 lb., or Endoweed 0.167 oz., per gal. of water; apply as a combined aerial spray and soil drench, wetting all leaves and stems to the point of dripping and applying balance of dosage to crown centers. Tergitol #7 should be used in all Ammate spray solutions at the rate of about 1 tbsp. for each gal. of spray solution. Dow Endoweed (2,4-D) already contains some wetting agent, but for most ribes species the addition of some Tergitol (about 1/2 tbsp. for each 10 gals. of spray soln.) will be helpful.

2/ This is the basic dosage that would be applied per unit of ground fully occupied by ribes and is considered to be the average dosage for the species. In actual practice the gallonage needed to provide adequate coverage of any species will vary according to the size and density of the stems and foliage. For example, some stands of R. lacustre can be adequately treated by 3/4 gal. per milacre, while others may take as much as 2 gals. For one or two-year-old plants the concentration and dosage of 1 lb. of Ammate per gal. and 1 gal. per milacre can probably be modified to use less chemical and more water, but little experimental data are yet available on the susceptibility of young plants.

Test in Broadcast Spraying Using Ammate Weed Killer (Ammonium Sulfamate) for Destroying Ribes in Cut-over Type

This study was instituted by Mr. Swanson with Messrs. Walters, Riley and Moss assisting in the field application. Effectiveness of treatment will not be known until the 1946 season. A chronological report of the study and comments by Mr. Swanson follow:

Plot Locations: Potter Creek, Coeur d'Alene National Forest.

Status of Area: Logged 1941, steep slope, brushy cover and windfalls, plot strips established perpendicular to slope between parallel roads about 627 feet apart.

Ribes: Large number of R. lacustre; few R. viscosissimum. Ribes seedlings one to five years old, some mature bushes.

Equipment: Hardie Sprayer, 30 gallons per minute, Imperial Pump mounted on 1½-ton truck. Capacity--400 gallons, pressure 400 pounds; Bean Sprayer Gun #789, 7/16 inch pressure hose.

Chemical: Total 2100 pounds Ammate Weed Killer, (ammonium sulfamate).

Date of Test: August 21-25, weather clear except cloudy on August 25 and light showers late afternoon.

Method: One hoseline and nozzle per chain-wide strip. Most practical way to work strip is to locate spray rig on upper end of strip and work hose lines down hill. If spray rig can only be located at bottom of strip, it is advisable to coil hose in sections, distribute at proper intervals along strip, then lay out hose line, connect sections, and work strip from top down. Laying hose line required 20 to 30 minutes per acre; refilling of 400-gallon tank required 25 minutes.

Plot Records

Plot No. 1

Acres: 4.75
Strips: 5, each 1 chain by 9½ chains
Chemical: 1690 pounds Ammate Weed Killer
Solution: 3260 gallons (1/2 lb. chemical per gallon of solution)
Nozzle disc apertures: 5/64" and 6/64"
Total man hours on nozzle: 20 hours and 55 minutes
Total man hours by strips:
- Strip 1: 3 hours, 54 minutes
- Strip 2: 4 hours, 38 minutes
- Strip 3: 4 hours, 6 minutes
- Strip 4: 4 hours, 9 minutes
- Strip 5: 4 hours, 8 minutes

Plot No. 2

Acres: .45
Strips: Two short strips 1 chain wide by 2½ and 2 chains long, respectively.
Chemical: 210 pounds Ammate Weed Killer
Solution: 280 gallons (3/4 lb. chemical per gallon of solution)
Nozzle disc aperture: 5/64" and 6/64"
Total man hours on nozzle: 2 hours

Plot No. 3

Acres: .93
Strips: Four strips each 1 chain wide by 3, 3, 1-3/4, and 1½ chains long, respectively
Chemical: 200 pounds Ammate Weed Killer
Solution: 800 gallons (1/4 lb. chemical per gallon of solution)
Nozzle disc aperture: 1/8"
Total man hours on nozzle: 3 hours, 54 minutes
Total man hours by strips:

Strip 1:	1 hour, 10 minutes	(approximately 230 gallons)
Strip 2:	1 hour, 2 minutes	(approximately 200 gallons)
Strip 3:	51 minutes	(approximately 185 gallons)
Strip 4:	51 minutes	(approximately 185 gallons)

Comments:

The test demonstrated the practicability of using power equipment in spraying 100 percent of the ground cover on cut-over areas. Under conditions of this test, approximately three-quarters of a man-day per acre represented the overall requirement. Solution was applied at the rate of about 800 gallons per acre. The success of this method is dependent upon a low cost chemical which will kill the upland ribes. As yet, the effectiveness of Ammate in this type of test is not known. While it is reasonable to expect some decrease in price of Ammate, the present price of 14 cents per pound makes the chemical costs on the plots approximately $50.00, $65.00, and $28.00 per acre.

The Effects of Variable Light and Moisture Conditions on the Germination, Growth and Development of Ribes lacustre, R. viscosissimum and Pinus monticola

This study was established in 1940 to determine factors influencing germination, survival and growth of the region's two major upland ribes species in association with western white pine under full sun, half shade and full shade light intensities. At each of these light stations seeds of ribes and white pine were sown on natural duff, mineral and burned-mineral soil surfaces. Dimensions of these soil surfaces were 8 by 10 feet with each divided into 20 subplots 2 feet square. This division made 5 rows of subplots 4 wide for each soil surface. With 20 subplots, 5 were assigned to each species of ribes, western white pine, and checks for natural seed germination. Each row of 4 subplots represented sowings of the two ribes species, white pine and a check subplot. Choice of subplot was made by random selection for each row. Rodent and bird-proof exclosures were constructed for each soil surface.

Germination, survival and growth studies were instituted in 1941 and continued in part through the 1945 season. Ribes surviving the 1943 growth season were removed, a practice continued with newly germinated ribes to avoid spread of the rust to natural pine in the vicinity of the plots. Removal of the ribes from the 1, 3, and 5 rows of subplots of each soil surface was accomplished by pulling, and from the 2 and 4 rows by shearing off at ground level with pruning clippers. The purpose of disturbing the soil surfaces of subplot rows 1, 3 and 5 by pulling of ribes followed by complete mechanical disturbance, was to attempt to stimulate germination in a study of viability. Subplot rows 2 and 4 were left undisturbed except for the removal of ribes at ground level by pruning shears to check germination of seed sown on original or undisturbed soil surfaces. Further discussions of this study have been presented in the 1940 to 1944 annual reports.

TABLE 1

NUMBER OF RIBES AND WHITE PINE SEED GERMINATING DURING THE SEASONS 1941, 1942, 1943, 1944 AND 1945; TOTAL SEED GERMINATING DURING THIS PERIOD AND PERCENT OF TOTAL SEED SOWN GERMINATING

Surface	Species	Light Intensity	Number Seeds Germinating by Seasons					Total Seed Germ.	Percent of Total Seed Sown Germ.
			1941	1942	1943	1944	1945		
Duff	Ribes lacustre	Full Sun	15	674	19	0	0	708	4.425
		Half Shade	42	1,348	239	12	0	1,641	10.26
		Full Shade	771	5,968	479	297	193	7,708	48.175
	Ribes viscosissimum	Full Sun	16	2	0	0	0	18	1.125
		Half Shade	54	1	0	0	0	55	3.44
		Full Shade	288	0	68	15	9	380	23.75
	Western White Pine	Full Sun	20	6	0	0	0	26	1.30
		Half Shade	49	90	5	0	0	144	7.20
		Full Shade	841	212	37	0	0	1,090	54.50
Mineral	Ribes lacustre	Full Sun	3,184	2,134	57	0	0	5,375	33.59
		Half Shade	2,725	6,078	367	16	0	9,186	57.41
		Full Shade	1,937	6,191	1,992	365	186	10,671	66.69
	Ribes viscosissimum	Full Sun	1,322	7	0	0	0	1,329	8.31
		Half Shade	1,092	11	0	0	0	1,103	6.89
		Full Shade	1,083	0	3	18	7	1,111	6.94
	Western White Pine	Full Sun	883	14	0	0	0	897	44.85
		Half Shade	1,170	29	11	0	0	1,210	60.50
		Full Shade	1,434	44	21	0	0	1,499	74.95
Burned-Mineral	Ribes lacustre	Full Sun	1,966	5,967	23	0	0	7,956	49.72
		Half Shade	2,650	8,493	437	7	0	11,587	72.42
		Full Shade	2,233	6,326	1,183	52	39	9,833	61.46
	Ribes viscosissimum	Full Sun	740	13	0	0	0	753	4.71
		Half Shade	1,556	19	0	0	0	1,575	9.84
		Full Shade	1,554	0	44	7	2	1,607	10.04
	Western White Pine	Full Sun	314	1	0	0	0	315	15.75
		Half Shade	1,200	39	7	0	0	1,246	62.30
		Full Shade	1,379	49	13	0	0	1,441	72.05

In Table 1 are shown the number of ribes and white pine seeds germinating from 1941 through 1945. The total number of seed and the percent of total seed sown germinating are also given. Ribes seeds were sown at the rate of 800 per square foot, or 3,200 per subplot, totaling 16,000 per plot, or soil surface. Seeds of white pine were sown at the rate of 100 per square foot, 400 per subplot, or 2,000 per plot or soil surface.

Of particular interest in the application of results to operational use is the contrast in quantity and period of seed germination between R. lacustre and R. viscosissimum. Seed of R. lacustre germinates readily and appears to retain viability longer than seed of R. viscosissimum under all conditions studied. It will be noted that differences in soil surfaces and light intensities have materially influenced the extent of germination between species and seed of the same species. With but few exceptions, germination increased toward conditions of full shade with its minimum soil moisture and soil temperature variations. Longevity or years which seed will retain viability undoubtedly has been influenced by soil moisture-soil temperature relationships, and to some extent possibly by seed becoming too deeply buried in the soil medium for germination.

TABLE 2

NUMBER OF SEED GERMINATING ON DISTURBED (1943) AND UNDISTURBED SOIL SURFACES WHEN CALCULATED ON THE BASIS OF TOTAL AREA SOWN PER SPECIES IN EACH PLOT

Surface	Status of Surface	R. lacustre			R. viscosissimum			White Pine		
		Full Sun	Half Shade	Full Shade	Full Sun	Half Shade	Full Shade	Full Sun	Half Shade	Full Shade
1944 Germination										
Duff	Disturbed	0	17	470	0	0	18	0	0	0
	Undisturbed	0	3	25	0	0	0	0	0	0
Mineral	Disturbed	0	22	578	0	0	23	0	0	0
	Undisturbed	0	5	30	0	0	0	0	0	0
Burned-Mineral	Disturbed	0	10	75	0	0	13	0	0	0
	Undisturbed	0	2	12	0	0	0	0	0	0
1945 Germination										
Duff	Disturbed	0	0	307	0	0	15	0	0	0
	Undisturbed	0	0	15	0	0	0	0	0	0
Mineral	Disturbed	0	0	301	0	0	12	0	0	0
	Undisturbed	0	0	9	0	0	0	0	0	0
Burned-Mineral	Disturbed	0	0	62	0	0	3	0	0	0
	Undisturbed	0	0	3	0	0	0	0	0	0

In Table 2 are shown the number of seeds germinating on disturbed and undisturbed soil surfaces. At the full sun station the disturbance of the soil surface was no added incentive for germination, the conclusion being that high soil temperature and low soil moisture were detrimental and caused seed devitalization. Under conditions of half shade the disturbance resulted in a slight increase of germination for R. lacustre seed over undisturbed subplots the year

following the disturbance. It is apparent that some seed buried too deeply for germination required aeration; otherwise seed devitalization resulted from soil temperature-soil moisture variations. At the full shade station the disturbance has been responsible for greatly increasing germination of R. lacustre seed and has added to the germination of R. viscosissimum seed.

The soil surface disturbance study has substantiated accrued knowledge that (1) seed devitalization results from soil temperature-soil moisture variations because longevity increases with uniformity of seed-storage environment and, (2) some seed becomes buried too deeply in a course of a few years for germination. Without aeration resulting from a disturbance of the soil medium the seed goes into a dormant condition.

An additional study upon longevity of ribes seed in relation to storage environment was undertaken this season with the recovery of ungerminated seeds from the disturbed subplots of each soil surface. This was accomplished by screening soils from each subplot to a depth of about 3 inches. Residues were retained from 20 and 30 mesh screens for further processing and recovery of seeds. Samples have been shipped to the Berkeley laboratory for final processing and germination studies of the recovered ribes seeds. Results of this study will be reported in the 1946 annual report.

Longevity of Ribes Seeds as Affected by Change of Storage Environment Resulting from Cutting of Mature Timber.

During the field season of 1944 a series of soil disturbance plots was established to determine relation of altered storage environment on the longevity of ribes seeds. The disturbance was accomplished by removal of the duff and thoroughly mixing the organic mantle with the top inch of mineral soil. A Latin Square plot was employed seven milacres in dimension. Each horizontal tier of seven milacres was established as a separate unit to avoid areas of burned slash piles and major skid trails. One milacre in each tier was selected at random for the disturbance. Every other year an additional milacre will be selected and subjected to similar treatment until six of the seven milacres in each tier have been disturbed for germination of ribes seed. The seventh milacre in each tier will remain undisturbed for a check. Additional discussion on the establishment and objectives of this study is reported in the 1944 annual report.

TABLE 3

NUMBER OF ORIGINAL RIBES BY SPECIES REMOVED FROM INDIVIDUAL MILACRES IN 1944 AND NEW SEEDLING GERMINATION ON MILACRES DISTURBED BY REMOVAL OF RIBES OR BY 100 PERCENT DISTURBANCE OF THE SOIL SURFACE, LACLERC CREEK, KANIKSU FOREST

Subplot No. and Ribes Species	Original Ribes (OR)								New Germination (NG)					
	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG
Subplot No.	1		2		3		4*		5		6		7	
R. viscosissimum	1	0	4	0	12	0	21	0	25	0	19	0	14	0
R. lacustre	2	0	2	0	7	0	2	0	4	0	6	0	0	0
Subplot No.	8		9*		10		11		12		13		14	
R. viscosissimum	5	0	12	0	2	0	4	0	8	0	14	0	6	0
R. lacustre	2	0	5	0	0	0	0	0	4	0	2	0	2	0
Subplot No.	15		16		17		18		19*		20		21	
R. viscosissimum	0	0	0	0	1	0	2	0	0	0	2	0	1	0
R. lacustre	1	0	0	0	0	0	0	0	2	0	5	0	10	0
Subplot No.	22		23		24		25*		26		27		28	
R. viscosissimum	6	0	6	0	0	0	0	0	0	0	0	0	1	0
R. lacustre	3	0	0	0	6	0	0	0	8	0	0	0	1	0
Subplot No.	29		30		31*		32		33		34		35	
R. viscosissimum	3	0	4	0	2	0	0	0	0	0	0	0	3	0
R. lacustre	0	0	3	0	0	0	0	0	0	0	0	0	9	0
Subplot No.	36		37		38		39		40*		41		42	
R. viscosissimum	0	0	2	0	2	0	3	0	1	0	0	0	5	0
R. lacustre	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Subplot No.	43		44		45		46		47		48		49*	
R. viscosissimum	1	0	6	0	1	0	2	0	1	0	3	0	3	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Designates subplots disturbed 100 percent in 1944.

In Table 3 are shown the number of original ribes removed from individual milacres of the plot located on the East Branch of LaClerc Creek, Kaniksu Forest. White pine logs were removed from this area in 1939 with some mixed and all cedar taken in 1941. On the average the heavy cut has resulted in an alteration of light intensities from less than 10 percent full sunlight before logging to better than 80 percent full sunlight after the removal of all merchantable trees. On a western exposure, the organic mantle has been observed to become tinder dry by midsummer. Ribes seeds stored within or beneath the organic mantle on top of mineral soil are thus subjected to relatively high soil temperatures and low soil moisture content during the summer months. Such an environment is a cause of seed devitalization. With four to six years' time elapsed since logging and the resulting alteration of the seed storage environment, no new ribes seedlings have been found germinating on the disturbed milacre plots or adjacent areas under observation. It can be tentatively concluded that stored ribes seeds have become devitalized through the drastic alteration of soil moisture, soil temperature, and the exchange of soil gases.

TABLE 4

NUMBER OF ORIGINAL RIBES BY SPECIES REMOVED FROM INDIVIDUAL MILACRES IN 1944 AND NEW SEEDLING GERMINATION ON MILACRES DISTURBED BY REMOVAL OF RIBES OR BY 100 PERCENT DISTURBANCE OF THE SOIL SURFACE, POTTER CREEK, COEUR D'ALENE NATIONAL FOREST

Subplot No. and Ribes Species	Original Ribes (OR) New Germination (NG)													
	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG
Subplot No.	1		2		3		4		5*		6		7	
R. viscosissimum	1	0	0	0	0	0	0	0	0	0	0	0	0	0
R. lacustre	5	0	0	0	26	0	13	0	7	0	3	0	1	0
Subplot No.	8		9		10		11		12*		13		14	
R. viscosissimum	0	0	0	0	0	0	1	0	0	0	0	0	0	0
R. lacustre	0	0	12	0	0	0	8	0	0	0	7	0	23	0
Subplot No.	15		16*		17		18		19		20		21	
R. viscosissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R. lacustre	0	0	1	0	0	0	1	0	0	0	1	0	3	0
Subplot No.	22		23*		24		25		26		27		28	
R. viscosissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	29		30		31		32		33		34*		35	
R. viscosissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R. lacustre	5	0	7	0	0	0	0	0	6	0	5	0	1	0
Subplot No.	36		37		38*		39		40		41		42	
R. viscosissimum	0	0	0	0	0	0	1	0	2	0	0	0	0	0
R. lacustre	0	0	2	0	10	0	20	0	3	0	1	0	0	0
Subplot No.	43		44		45		46		47		48*		49	
R. viscosissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R. lacustre	0	0	0	0	0	0	0	0	2	0	0	0	0	0

*Designates subplots disturbed 100 percent in 1944.

The Potter Creek study located on the Coeur d'Alene National Forest is shown in Table 4. This area was logged in 1941 with improvements a year earlier. The exposure selected for study faces north by a few degrees east. Early bug loss by the mountain pine beetle Dendroctonus monticolae had resulted in some canopy openings, but on the whole, the original stand was sufficiently dense to inhibit development of nearly all brushy plants. The site as would be expected on a steep north exposure, was moderate to heavily moist. After logging it was observed that by midsummer the organic mantle was fairly dry but mineral soil remained moist throughout the season. Surprising has been the fact that new ribes germination has not resulted from the plot disturbances nor can new seedlings be found on the area as a whole the fourth year after logging. One exception was the germination of a R. lacustre seedling from the debris removed off milacre number 34. Since R. lacustre has proven the more troublesome of the two upland species in germination and longevity of seeds, these early observations are hardly sufficient to warrant conclusions. It might be added that the results to date are highly encouraging since it was suspected that germination would be exceedingly heavy for R. lacustre on the Potter Creek plot.

TABLE 5

NUMBER OF ORIGINAL RIBES BY SPECIES REMOVED FROM INDIVIDUAL MILACRES IN 1944 AND NEW SEEDLING GERMINATION ON MILACRES DISTURBED BY REMOVAL OF RIBES OR BY 100 PERCENT DISTURBANCE OF THE SOIL SURFACE, CORBETT CREEK, ST. JOE FOREST

Subplot No. and Ribes Species	Original Ribes (OR)								New Germination (NG)					
	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG
Subplot No.	1		2		3		4*		5		6		7	
R. viscosissimum	0	0	0	0	1	0	2	1	1	0	2	0	17	1
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Subplot No.	8		9		10		11		12*		13		14	
R. viscosissimum	0	0	0	0	0	0	0	0	1	0	0	0	1	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	15		16		17		18		19		20		21*	
R. viscosissimum	1	0	3	0	16	0	0	0	0	0	1	0	6	1
R. lacustre	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	22		23		24*		25		26		27		28	
R. viscosissimum	3	0	30	1	3	0	0	0	0	0	4	0	16	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	29*		30		31		32		33		34		35	
R. viscosissimum	19	12	5	0	0	0	0	0	0	0	0	0	0	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	36		37		38*		39		40		41		42	
R. viscosissimum	0	0	0	0	0	0	0	0	10	0	1	0	0	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	43		44		45		46		47		48*		49	
R. viscosissimum	0	0	12	1	15	0	11	0	11	0	1	11	1	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Designates subplots disturbed 100 percent in 1944.

The Corbett Creek plot is located on a fork of the west branch of Merry Creek, St. Joe Forest. Cutting of mature timber from this fork was over a three-year period, 1935 to 1937. The plot was established on area cut of timber in 1936. The degree of cut was relatively light since for the most part white pine was the only species removed. The residual stand is composed mainly of cedar and grand fir. The irregular pattern of cut has resulted in conditions representing quite a variation in intensities of light. It was possible, therefore, to distribute the series of seven milacres over a wide range of environmental conditions. The area selected for study has a northeasterly exposure with moderate steepness. The soil is of a heavy loam retaining surface moisture throughout the season except where cutting has been heavy.

It is not difficult to visualize the degree of canopy opening, or the alteration of the seed-storage environment by the new ribes seedlings occurring on the milacre plots. It was generally found that where new germination occurred, the seed-storage environment was least altered from the original condition existing under a dense mature stand of timber. Considerable evidence was apparent from this study that the length of time old ribes seeds will remain viable following a major disturbance is dependent upon the degree to which the seed-storage environment is altered by removal of the canopy. A more direct approach to this question will be made commencing next season by the screening and recovery of ribes seeds from storage for germination tests.

Infection Conditions during 1945

During July, weather conditions were unfavorable for the development of the rust because air temperatures were high with only slight traces of rain on two days. In August there were eight days with at least a sprinkling of rain, but temperatures remained high, making conditions unfavorable for rust development. Urediospores, however, developed well on ribes. In fact, an inspection of ribes on all permanent north Idaho plots showed that rust development was about on a par with the previous season. Plots on the Clearwater National Forest exhibited increased ribes infection, while those on the Kaniksu National Forest exhibited decreased ribes infection.

September 15-17 and September 20-26 were periods favorable for pine infection since both were relatively cool, rainy, and cloudy. Considerable spread from ribes to pine and subsequent infection of the pine may have taken place during these two periods.

Pine inspections finished the last season verified the conclusion that there has been little, if any, infection since 1941.

Pine Infection Adjacent to the Powder House Plot

During 1944 the entire Powder House plot was sampled to determine average conditions of infection existing within the plot boundaries. Results indicated that infection on the plot averaged approximately 32 percent. This season, sample strips were extended from the sides of the plot to determine the average percentage of infection in the areas immediately adjacent to the plot boundaries. Results of this sampling indicated that on areas adjacent to the south and east boundaries the infection averaged approximately 36 percent, while on the area adjacent to the north boundary the infection averaged approximately 42 percent. No sampling was done on the west boundary of the plot as that side borders on a large pole type. Comparison of the average percentages of infection in and around the plot led to the conclusion that there was slightly less infection on than around the plot.

Further Ribes Reduction on the Powder House Plot

There have been two reductions made in the number of ribes on the 95-acre Powder House plot since it was established in 1938. The original plot supported 161 ribes. These were reduced in 1940 to 70 ribes, and again during the past season to 17 ribes. Live stem of the original 161 ribes was 2,924 feet. This was reduced in 1940 to 1,975 feet, and again this season to 381 feet.

The Powder House Western White Pine Pruning Experiment

Since 1940 there has been considerable interest expressed throughout this region regarding the possibility of salvaging blister rust infected white pine stands through pruning procedures. In this light several pruning projects have been undertaken since that time. These have been on a relatively large

scale, practical basis with all infected trees pruned. Outside of these practical experiments, there is an extensive literature dealing with recent blister rust control pruning experiments, and with earlier ventures in which pruning was undertaken for reasons other than blister rust control. Throughout this literature there is a wide divergence in conclusions as to the best pruning methods to employ.

Summarizing the literature briefly, without actually citing it, this divergence in opinion concerning pruning practice may be shown as follows:

1. (a) pruning in relation to blister rust control has been variously described as valueless on heavily infected areas but of some value on lightly infected areas; (b) as preventing losses in already infected stands but valueless without further ribes eradication; (c) in the writer's opinion, valuable on heavily infected areas where pruning for salvage is the only method which will assure a reasonable stocking but valueless in lightly infected stands where ribes have been satisfactorily reduced and where additional small losses from the rust will not materially reduce the final stocking.

2. The height to which white pine and other species should be pruned is also a matter of much controversy. Recommendations vary from one-fifth to three-quarters of the live crown height.

3. Opinions as to the number of trees per acre that should be pruned are likewise variable, ranging from 100 to 200 trees per acre when pruning for silvicultural reasons, and ranging up to and including all white pine trees when pruning to reduce blister rust losses.

4. Several recommendations as to the earliest age at which pruning measures should be inaugurated are also found in the literature, apparently varying depending on the purpose for which the pruning is being done. Silviculturists generally agree that pruning should not be undertaken until the stand has attained the age of twenty years. Blister rust workers, on the other hand, realizing that the greatest rust losses take place when the stand is under twenty years of age, have recommended pruning to reduce rust damage at an earlier age.

Furthermore, there seems to have been no previous experimentation aimed at answering questions regarding correct procedures when pruning both for the reduction of rust damage and in view of selection of probable crop trees (selective pruning).

Due to the existing difference in opinion and conclusion regarding pruning measures, this study was begun. Its object is to determine the best procedures for pruning blister rust infected stands on a selection basis when pruning is employed to reduce rust damage to secure, at rotation age, a fully stocked stand composed of the most desirable white pine individuals.

I. Methods Employed in the Pruning Experiment

A. Selection of the Experimental Area

The Powder House plot on the Clearwater National Forest was chosen as the experimental area for the following reasons: (a) The entire plot area was already surveyed and staked out in one chain squares. (b) The pine infection on

the area had reached an advanced enough stage (varying widely around the 32 percent average of 1944) so that pruning might be expected to shed some light on the benefits under conditions of heavy infection. (c) The area was naturally stocked and supported white pines both older and younger than 20 years of age.

B. Arrangement of the Pruning Blocks within the Plot

The entire eastern side of the Powder House plot area was allotted to this pruning study. Thirteen blocks of white pine reproduction were laid out on this area. Eleven of these blocks, varying in size from 2 to 30 square chains, were used this season to accommodate the various combinations of pruned trees per acre, percentage of infection, and original natural stocking. Data on the stocking, the existing infection, and the number of trees planned to be selectively pruned per acre are shown in Table 1 below to demonstrate the range of conditions.

TABLE 1

ACREAGE, STOCKING, PERCENT INFECTION, AND PRUNING STANDARD ON ELEVEN TREATED BLOCKS

Block Number	Block Acreage	No. Pines on Entire Block	Estimated No. Pines Per Acre	Percent Infection	Pruning Standard No. Trees Per Acre
1	1.6	1,080	675	58	120
2,3,& 4	1.2	1,336	1,113	64	360
5	0.4	357	892	37	240
6	0.4	268	670	27	240
8	0.4	634	1,585	30	240
9	1.6	1,146	716	31	360
10	3.0	1,560	520	29	240
11	0.2	78	390	20	240
12	1.6	446	279	37	240

Two blocks, numbers 7 and 13, were not treated this season. They are of use, however, as checks.

Height of pruning on the 11 treated blocks was confined to one-third of the live crown height of the trees but another series of tests was established on the Powder House and Hollywood plots wherein trees were pruned to various heights. In order to determine what pruning to one-third of the live crown height meant in terms of foliage removed, another small study was made to determine the amount of foliage removed when pruning to one-third of live crown height.

C. Pruning in Relation to Control of Blister Rust Damage

Over a period of years it has been determined that branch cankers over 12 inches from the trunk and without intervening live lateral or sub-lateral branches will in the great majority of cases not reach the trunk. With this in mind, the distance between the nearest canker and trunk was recorded on all

infected pruned trees. This figure was then used to determine whether or not pruning had saved the particular pruned tree from eventual death caused by the rust. Accumulated data of this sort were then used to give an over-all measure of pruning salvage.

D. Selective Pruning Methods

It has already been stated that one of the primary objectives of this experiment was to determine standards and effectiveness of pruning for the control of blister rust damage on a selection basis, i.e., pruning the best crop trees only. In this experiment selective pruning standards of 100, 200, and 300 trees per acre were chosen. The three standard numbers were then increased by 20, 40, and 60 trees per acre respectively, the increases representing a margin of safety to cover subsequent blister rust losses due to the failure to prune all potentially damaging cankers during treatment.

Following these standards, the problem of distribution of the trees to be pruned over the pruning block was considered. It was decided that each pruning block would be divided into 120 equal sub-blocks, 16½ by 22 feet (19 by 19 feet in the case of block 12) in size. Hence, to obtain the standard of 120 pruned trees per acre evenly distributed over the pruning block one tree was selected and pruned in each sub-block; the standard of 240 trees per acre, two trees per sub-block; and the standard of 360 trees per acre, three trees per sub-block. Figure 1, a tabular representation of how sub-blocks were placed in the blocks, shows how this method of obtaining even distribution of the selectively pruned trees actually worked out on the ground in blocks 1, 2, 3, and 4. It will also be noticed from Figure 1 that certain of the selectively pruned trees had excised trunk cankers. Such trunk-cankered trees were selected only when distribution of suitable trees on the sub-blocks was below standard and the cankered trees were the only available substitutes.

E. Personnel Used for the Selective Pruning Experiment

Personnel employed to do the labor required in the selective pruning work numbered four. Two were obtained through the Office of Blister Rust Control and two through the Supervisor's Office of the Clearwater National Forest.

F. Check Trees and Check Areas

During the course of the selective pruning work, occasions arose where it was possible to select trees similar in diameter, height, and other characteristics which were adjacent to each other on the sub-blocks. Thirty-six such paired trees were found; one was pruned to one-third of its live crown height while the other was merely measured and remained untreated as a check (photo W355). In blocks where selective pruning requirements left few trees on the sub-blocks which were suitable for use as paired trees, it was necessary to select similar trees from adjacent unpruned areas. Thirty of these adjoining check trees were selected and measured. In addition, the large three-acre block (No. 13) and the smaller block (No. 7) remained untreated this season and are useful as check areas.

FIGURE 1

TOTAL NUMBER OF TREES, NUMBER OF INFECTED TREES, AND NUMBER OF TREES SELECTIVELY PRUNED ON THE SIXTEEN AND ONE-HALF BY TWENTY-TWO FOOT SUB-BLOCKS AS THEY ARE LAID OUT ON BLOCKS 1, 2, 3, AND 4

A.

Tree Selection for Pruning Based on a Standard of 120 Trees Per Acre or 1 Per Division

	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned	No. Trees	No. Inf.	Pruned
Block 1	11	4	1	5	2	1	-	-	-	1	-	1	1	-	1	1	-	1	6	2	1*	15	3	1	9	4	1*	14	6	1	10	4	1	9	4	1
	3	-	1	-	-	-	3	1	1	-	-	-	-	-	-	-	-	-	7	2	1*	3	-	1	23	10	1	23	6	1	9	3	1	9	4	1
	2	-	1	-	-	-	3	1	1	4	1	1	4	2	-	2	1	1	2	1	-	19	8	1	13	6	1	16	6	1	23	10	1	19	6	1
	5	2	1	2	1	-	13	4	1	8	4	1	1	-	1	4	2	1	23	10	1	15	7	1	3	1	1	12	5	1	14	5	1	17	6	1
	8	3	1	8	3	1*	5	1	1	14	6	1	5	2	1	2	1	1	4	1	1	3	1	-	17	6	1	6	2	1	7	1	1	4	1	1
	7	2	1	4	1	1*	2	1	-	10	4	1*	11	4	1	10	5	1*	3	1	1	10	3	1	7	1	1	4	-	-	-	-	-	1	-	1
	3	-	1	4	2	1	9	2	1*	5	2	1	6	3	1	4	2	1*	3	1	1*	2	-	1	5	1	1	10	4	1	3	-	1	2	1	1
	18	8	1	10	4	1	7	2	1	6	3	1	8	4	1	11	5	1	4	2	1	13	5	1	11	5	1	3	1	1*	6	3	1	2	-	1
	11	4	1	12	5	1	3	1	1*	4	2	1	4	2	1*	4	1	1*	6	2	1	5	1	1	7	3	1	4	-	1	5	1	1*	13	2	1*
	8	3	1	4	2	1	7	3	1	3	1	1	8	2	1	8	4	1	6	1	1	8	4	1	2	-	-	12	5	1	4	1	1	12	3	1
	2	1	1	8	3	1	2	-	-	3	1	1	8	2	1	18	8	1	18	8	1	10	3	1	11	4	1	27	12	1	3	1	1	9	3	1
	9	3	1	15	5	1	3	1	1*	3	1	1	7	3	1	20	9	1	15	6	1	13	5	1	13	6	1	15	4	1	11	2	1	15	6	1
	4	2	1	34	13	1	5	2	1	2	1	-	-	-	-	2	-	-	4	1	1	8	1	1	10	3	1	30	12	1	32	14	1	38	12	1
	8	3	1	13	5	1	5	2	1	4	1	1	-	-	-	9	4	1	3	1	1	20	6	1	12	4	1	5	-	1	11	5	1	12	3	1
	3	1	1	10	4	1	2	-	-	12	6	1	5	1	1	14	7	1	6	3	1	11	4	1	33	14	1	10	2	1	25	11	1	34	11	1
	16	7	1	-	-	-	2	1	-	11	5	1	3	1	1	15	6	1	14	6	1	30	13	1	16	6	1	9	3	1	19	7	1	38	15	1

B.

Tree Selection for Pruning Based on a Standard of 360 Trees Per Acre or 3 Per Division

Block 2	33	10	3*	8	3	1	-	-	-	7	2	2*	2	1	1	3	1	-	11	5	3	28	12	4*	8	4	2	3	1	1	11	5	4*	31	12	4*
	20	6	3	11	4	2*	-	-	-	9	4	2	9	4	-	16	7	3	9	4	2	9	3	2*	8	3	2	15	7	4	12	5	2	35	13	4*
	13	5	4*	11	4	1	4	1	1	1	-	1	5	2	2	21	10	3	18	8	3	22	9	3*	5	1	2	7	3	2	22	7	3	65	24	4*
	6	2	1	11	5	2	2	1	-	-	-	-	8	3	3	10	4	3	17	7	4	8	3	1	4	1	2	10	4	2	18	8	1	24	9	4
Block 3	3	1	2	2	1	1	2	1	1	5	2	2*	9	4	1	5	2	1	14	6	2	28	13	4*	24	6	4	27	13	4	6	2	3	26	10	4*
	1	-	-	-	-	-	7	2	4	8	3	3	21	10	4	13	4	3	6	3	2	4	1	1	19	9	2	3	1	1	13	6	3	60	25	3
	-	-	-	-	-	-	4	-	1	3	1	1	20	8	4	8	4	3	13	6	3	5	2	2	-	-	-	8	3	3	32	13	5	37	14	3
	1	-	-	1	-	1	9	4	2	3	1	1	12	4	3	8	3	3	43	17	4*	34	15	3*	9	4	2	15	6	2	20	9	3*	31	15	4*
Block 4	7	2	2*	14	6	3	7	3	3	9	4	2	11	5	3	12	5	2*	17	7	4	17	7	2	11	5	2	22	10	5	39	17	4	34	14	4
	13	4	2	23	4	3	10	2	3*	19	7	4	28	11	5	5	2	2	48	20	4	36	14	7	15	7	3*	1	-	1	27	13	4	3	-	1
	36	8	4	25	7	4	12	5	3	20	8	5	9	3	3*	14	3	3	45	15	6	29	13	5	11	4	2	8	4	4	11	2	2	4	1	2
	29	9	3	25	8	3	12	6	3	40	17	3*	56	20	4	23	8	3*	50	15	4	28	12	6	35	16	4	15	6	4	22	10	3*	2	1	-

*Tree with trunk canker selected as crop tree end canker cut out.

W355. An example of paired trees. Object is to determine the effect of pruning off one-third the crown height. Tree number 112P, unpruned, on the left and number 112, pruned, on the right. Trees approximately 20 feet tall and 3.5 inches in diameter at breast height. Powder House Plot. Pruned July 2, 1945 and photographed on July 23, 1945.

G. Pruning Tools and Pruning Technique

In this experiment two types of pruning saws, two types of hand pruners, and one type of long-handled pruner were used. A linoleum knife was used to excise trunk cankers.

Differences of opinion as to how close to the trunk to prune, and as to where the pruning cut should be placed in relation to the definite branch collar characteristic of western white pine, led in this experiment to pruning part of the trees as close to the trunk as possible while others were pruned just within the outer edge of the branch collar.

H. Pruning in Relation to Sunscald and Winter Injury, Disease and Insect Attack

Pruning commenced in June and continued into July. The different times of pruning, therefore, are to be considered in the light of what effect they may have on subsequent sunscald damage. Pruned trees in the open can also be compared with pruned trees in varying degrees of shade. Winter injury, also of common occurrence on pruned trees, plus disease and insect injury may also be investigated through comparisons of pruned and check trees.

II. Preliminary Results and Conclusions at the End of the First Season

A. Distribution of Stocking

By referring back to Figure 1 it can be seen just how closely tree distribution over blocks 1, 2, 3, and 4 fitted the layout of the sub-blocks. A tabular comparison between block 1, block 12, and the grouped blocks 2, 3, and 4, is given in Table 2 below.

TABLE 2

NATURAL DISTRIBUTION OF TREES ON THE EXPERIMENTAL PRUNING BLOCKS SHOWING THE EFFECT OF THIS DISTRIBUTION ON THE NUMBER OF TREES ACTUALLY PRUNED PER ACRE

Block Number	1	12	2, 3, & 4
Pruning Standard, Trees Per Acre	120	240	360
Estimated Natural Stocking, Trees Per Acre	675	279	1,113
Block Acreage	1.6	1.6	1.2
Total Number of Sub-blocks	192	196	144
Number of Sub-blocks Completely Unstocked, or Understocked in Some Degree for Meeting Standard	22	51	67
Percent of Sub-blocks Completely Unstocked, or Understocked in Some Degree for Meeting Standard	11	26	47
Actual Number of Trees Pruned Per Acre under Field Conditions	106	133	307 (265)*
Percent Fulfillment of Pruning Standard	88	55	85 (74)*

* Numbers in parentheses represent an estimation of conditions had not more than the standard number of trees been pruned on all sub-blocks.

Further examination of Figure 1 shows that within the blocks there are completely unstocked sub-blocks, sub-blocks which were stocked to varying extents but which supported no suitable trees for selective pruning; sub-blocks which were stocked to varying extents but which supported only one or two trees suitable for selective pruning, and sub-blocks upon which from one to four extra trees, above standard, were pruned. Returning to Table 2, it is apparent that the degree with which it is possible to fulfill the requirements of any selective pruning standard will depend to a large extent on the stocking and its distribution. The pruning standard was 88 percent fulfilled on block 1, where the pruning standard was low and the stocking average; it was only 55 percent fulfilled on block 12, where the pruning standard was average and the stocking low; and it was 85 percent fulfilled on the combined blocks 2, 3, and 4, where the pruning standard was high and the stocking dense. In the latter case, however, if the practice of increasing the number of pruned trees by pruning more than the allotted number on almost two-fifths of the sub-blocks had not been followed, the pruning standard would have been only 74 percent fulfilled.

B. Selective Pruning in Relation to Blister Rust Damage Reduction

It has been already stated that in this study only branch cankers 12 inches and less from the trunk, without intervening live lateral branches, were considered to be potentially killing cankers. Using this figure for a basis in determining the numbers and percentages of pruned trees which were saved from death due to blister rust by the pruning treatment we find that the percentages of pruned trees saved vary from 24 to 68 percent. Variation is apparently caused by differences in stocking, in distribution of stocking, in percentage of infection, and in the pruning standard. This information is summarized for each block and averaged for the entire pruned area in Table 3 below.

TABLE 3

A COMPARISON OF PRUNED AND UNPRUNED BLOCKS IN RELATION TO RUST DAMAGE REDUCTION

Pruning Standard, No. Trees Per Acre	120	240						360		Averages All Blocks
Block Numbers Included	1	5	6	8	10	11	12	2,3,& 4	9	
Stocking, No. Trees Per Acre	675	892	670	1,585	520	390	279	1,113	716	760
No. Trees Actually Pruned Per Acre	106	205	200	193	189	145	133	307	234	
Percentage of Infection	58	37	27	30	29	20	37	64	31	37
Percent Infected Pruned Trees without Killing Cankers	13	33	42	31	36	18	16	29	37	28
Percent of All Pruned Trees without Killing Cankers	32	62	74	60	76	69	62	42	77	62
Estimated No. Dominant & Codominant Trees Per Acre Pruned Surviving without Pruning or Further Infection	34	127	148	115	143	100	82	129	180	118
Estimated No. All Trees Per Acre Surviving without Pruning or Further Infection	343	423	565	1,252	425	325	191	607	577	523

Perhaps the most interesting thing that will be noticed about Table 3 is that the estimated residual (as yet uninfected or infected but potentially undamaged) stand remaining on the pruning blocks even without the pruning measures ranges from 191 to 1,252 trees per acre. This residual stand is composed of from 34 to 180 of the dominant and co-dominant trees which were selected for pruning in this experiment, plus other dominant and co-dominant trees which it may not have been necessary to prune due to their distribution, and the remainder of the uninfected or infected but potentially undamaged intermediate and suppressed trees.

It is realized that these residual stocking figures preclude any further intensification of the rust, and just what effect such intensification might have is not known at this time. Presumably some measure of stocking will be maintained, even on blocks where the infection averages 37 percent and will probably continue to increase. It is perhaps regrettable that the further reduction in stocking due to subsequent inroads of the rust cannot be estimated now. In this region, stands of this age-class with these conditions of stocking and infection existing cannot be classified as to future stand potentialities because the rust has not been present long enough to provide an answer. It appears from Table 3, however, that only in areas of low, poorly distributed stocking (such as block 12) will selective pruning measures be valuable. On block 12, it will be seen that the stocking is only 279 trees per acre, that the distribution of this stocking is irregular, yielding only 133 selectively pruned trees per acre, and that without such pruning only 191 poorly distributed, intermediate and suppressed trees would remain under stabilized rust conditions.

In relation to pruning from the standpoint of reducing rust damage, it is also of interest to note the occurrence of trees with excised trunk cankers used as selectively pruned trees. Referring back to Figure 1, it will be noticed that on block 1, 17 trees or 10 percent of those selectively pruned had excised trunk cankers. In comparison, on blocks 2, 3, and 4, where three times as many trees were pruned, only 27 trees or 7½ percent of those selectively pruned had excised trunk cankers. Even with a higher pruning standard and percentage of infection the greater density and better distribution of stocking on blocks 2, 3, and 4 allowed more leeway in avoiding the selective pruning of trunk-cankered trees.

C. Personnel Problems

Of four men employed as laborers in this exacting type of selective pruning work, only two met required standards of experience and efficiency. It was apparent from this that on large-scale selective pruning projects some difficulty would be encountered in obtaining the necessary personnel.

D. Pruning Tools and Techniques

Of two pruning saws used, one with long and nearly vertical teeth (about 6½ points to the inch), cutting on both push and pull strokes, was found to be best for pruning above the height reached by hand pruners. The saw was superior to the unwieldy type of long-handled pruner employed.

Of the two types of hand pruners employed, the Seymour Smith and Sons hand pruner proved to be less fatiguing and more efficient than the Wiss hand

pruner. Both of these hand pruners, however, were of the type having only one cutting edge, the other edge being merely a flat metal strip which the sharp edge cuts against. It is believed that considerable improvement in the work could be obtained by using pruners with two cutting edges and adjustable blades, as the Porter Pointcut Pruner. This new type of pruner has been recommended by several other pruning investigators. The linoleum knife used to excise trunk cankers proved to be quite satisfactory.

E. Brush Disposal

Disposal of pruned limbs and trunk-cankered trees cut out to remove competition did not appear necessary as the number of trees treated per acre is small and the brush well distributed. If, however, prevention of aecial sporulation is an objective the following season, then the brush should be burned as about 10 to 20 percent of the excised cankers will sporulate the following spring.

F. Costs of Selective Pruning

In this experiment, where trees averaging 15 years in age and 18 feet in height were selectively pruned to one-third of their height, costs varied from $3.20 to $5.10 per hundred trees pruned. Other prunings in the 20 to 30 year age-class, pruning one-quarter to one-third of the height of the trees, have cost as little as $1.35 to $1.60 per hundred trees. It is felt, however, that pruning costs on this experiment could have been reduced if the work had been done on a larger scale and with more efficient tools.

G. Sunscald Symptoms

Two areas, one pruned in early June and the other pruned in early July, were checked in September for indications of injury due to scalding by the summer sun. The only symptom evident was a definite fading of the chlorophyll in the bark, resulting in varying degrees of reddish coloration on the west and south sides of the pruned trees. On the area pruned in June 39 percent of the trees exhibited this symptom while on the area pruned in July 58 percent of the trees exhibited this symptom. Further checking will reveal if the symptom is associated with sunscald injury of the pruned trees.

H. Insect and Disease Attack

Another, and possibly much more serious, type of injury associated with the pruning in this particular experiment was an unexpected attack of the pruned trees by beetles. Because of the extent of this injury, and because it may have been overlooked in unpruned western white pine stands of this age, observations on its association were made in some detail during the past season. For the present, however, only general information on the beetle attack will be given, the detailed information being held for a more complete report to follow at a later date.

The earliest pruning in this experiment began on June 1 and continued until June 15. On June 19 one pruned tree with an excised trunk canker was observed which was attacked near the ground by a Dendroctonus beetle (see W352).

W352. Attack of white pine tree number 66 in block 1 by Dendroctonus valens LeC. Tree was pruned one-third of its height and a large trunk canker cut out at the base on June 11, 1945. The tree was subsequently attacked by the beetle, the points of entrance being at the edge where the bark was removed. The channels on the right were cut out on July 17 and a pair of adult beetles were removed from each channel. Another channel is evident on the left. Tree is 16 years old, 20 feet high, and 4.80 inches in diameter at breast height. Photographed on July 23, 1945.

Specimens of the beetle were sent to Mr. James C. Evenden, Entomologist, Forest Insect Laboratory, Bureau of Entomology and Plant Quarantine, Coeur d'Alene, Idaho, who identified it as Dendroctonus valens LeConte, the red turpentine beetle. Subsequent to this first discovered attack by the beetle it was noticed that a considerable number of the pruned trees were similarly infested, as were unpruned white pines, grand firs, western yellow pines and larches. It was further observed that unpruned white pines on sizable areas were dying and that of the three infested yellow pines found all were dead or dying.

The beetle problem was further complicated by its frequent association with a root rot fungus, probably Armillaria Mellea (Vahl.) Quel. Which of these, the beetle or the fungus, initiates the attack on white pine has not yet been determined, but in this case it is strongly indicated that primary attack may be attributed to the beetle (photos W352 and W370-1). In either event, it is believed that the beetles are attracted to the pruned trees by a flow of pitch from pruning wounds.

In early September a check was made in order to obtain some information on the extent and characteristics of the beetle infestation. The following data, Table 4, were gathered:

TABLE 4

INFESTATION BY DENDROCTONUS VALENS IN RELATION TO TIME OF PRUNING

Time of Pruning	June 1-15	July 7-8
Number of Trees Checked	173	141
Total Number of Trees Attacked by Beetle	40	5
Percent of Trees Attacked by Beetle	23	3.5

It will be noticed that almost seven times more infestation by the red turpentine beetle took place on the trees pruned in June. This higher degree of infestation is attributed to the relatively greater amount of bleeding, or pitching, resulting from June pruning when the trees were growing most vigorously, and to the attraction which this pitch flow is believed to have for the beetles. Although it is not yet definitely known what percent of the trees will be killed as a result of this beetle infestation, it seems best that no pruning be done earlier than July if such infestations are to be held at a minimum.

Summary

An experiment considering the pruning of western white pine reproduction below 20 years of age, in view of treating only selected crop trees and in relation to reduction in blister rust damage, has been established embracing more than 10 acres in the Clearwater National Forest.

It has been found that a frequent cause of difficulty in the selective pruning of a predetermined standard number of trees per acre is the inequality of tree distribution over a natural area. Over-all per acre density of stocking is apparently correlated with this inequality in tree distribution.

Under the rust conditions encountered, selective pruning was found to save a maximum of almost 70 percent of the pruned trees from eventual death due to blister rust. The value of such pruning, however, especially in well-stocked stands of about 40 percent average infection, is questionable because it cannot at present be estimated what density of stocking would eventually be attained without the pruning. Selective pruning should apparently be reserved to very heavily infected areas or to areas of average infection where the stocking is quite low.

Severe beetle infestation by Dendroctonus valens LeConte has been found in selectively pruned plots. The beetles are believed to be attracted by the flow of sap from pruning wounds, and the intensity of their attack may be correlated with the relatively greater sap flow occurring on trees pruned early in the season.

III. LABORATORY, GREENHOUSE, AND SPECIAL ACTIVITIES

Laboratory, greenhouse, and special activities at Berkeley, California, at Spokane, Washington, and at Moscow, Idaho, were in progress during the spring and early winter of 1945. All regular methods personnel were engaged in these activities. C. R. Stillinger was assisted in compilation and analysis of disease study work by a part-time employee, Mrs. Evelyn J. Daubenmire.

Principal laboratory and greenhouse activities related to the testing of new plant hormone-type weed killers. Tests of 2,4-dichlorophenoxyacetic acid (hereafter called 2,4-D) and its water soluble analogs were made on duckweed, barley, and ribes in a series of tests designed to devise the most suitable formulae for field use. A concentration of 800 p.p.m. of 2,4-D (either as a sodium or ammonium salt; in mixture with Carbowax in acid, neutral or alkaline medium; as an acid, alkaline or neutral soap of triethanolamine; or as a sodium salt in mixture with excess sodium carbonate) proved to be fully effective on Ribes roezli under greenhouse conditions. The field tests based on the results of this preliminary laboratory and greenhouse work are given under "Improvement of Chemical Methods for Ribes Eradication" in this report.

Rapid microchemical methods were tested and used to analyze a large number of sugar-pine-type soils (Sierra Nevada) for the principal nutrient constituents of nitrogen, potassium, calcium, phosphorus, magnesium, manganese, etc., to establish correlations between R. roezli sites and chemical properties of the soil. The best correlation between sites of high ribes regeneration and the nutrient constituents of the soil was furnished by nitrate and ammonia nitrogen. Also some correlation was noted between nitrogen content of the soil and the record of fires over the area from which the soil sample had been collected.

Methods previously devised for extracting ribes seeds from duff and soil were used for processing samples from the Northwestern, Southern Appalachian, and Pacific Coast Regions.

Studies on the longevity and germinative reactions of ribes and pine seeds were continued, as were special activities in the design of methods for the statistical analysis of data on pine disease and completion of a report on blister rust damage and control requirements relative to age classes in the management

of western white pine. A summary report was prepared to describe and illustrate all special ribes eradication equipment devised during the past 20 years; H. Miller Cowling prepared considerable photographic material for this report.

In completing the above work, the following special reports were prepared and made available to blister rust personnel of the Northwestern and Pacific Coast Regions during the calendar year of 1945:

Blister Rust Damage and Control Requirements Relative to Age Classes in the Management of Western White Pine. (Preliminary Report to Spokane Office)
. . . . . Virgil D. Moss

Bureau Ms. 7847:
Poison Oak (Rhus Diversiloba) and Its Control by Mechanical and Chemical Means.
. . . . . H. J. Hartman and H. R. Offord

Field Equipment Developed Specially for the Eradication of Ribes in the Northwestern and Pacific Coast Regions.
. . . . . H. R. Offord, J. F. Breakey, and L. P. Winslow

Serial No. 123:
Survival in the Greenhouse of Small Ribes Roezli Seedlings Following Removal of Aerial Parts.
. . . . . L. P. Winslow

Serial No. 124:
An Ecologic History of a Ribes Population on an Upland Plot in the Central Sierra Nevada in Relation to Ribes Eradication Work.
. . . . . C. R. Quick

Serial No. 125:
Experimental Germination of Ribes and Pine Seeds. Series of 1944.
. . . . . C. R. Quick

Serial No. 126:
What an Ecologist Should Like to Know about an Herbarium Specimen.
. . . . . C. R. Quick

Serial No. 127:
Microchemical Soil Tests on Soil Samples Collected in the Sugar Pine Forests of the Sierra Nevada Mountains.
. . . . . L. P. Winslow

Serial No. 128:
Growth in the Greenhouse of Ribes, Ceanothus, and Sugar Pine Seedlings.
. . . . . C. R. Quick

Serial No. 129)
Bureau Ms. No. 7711):
A Rapid Method for Estimating the Phytocidal Action of Chemicals.
. . . . . H. R. Offord

Serial No. 130:
Growth of Sugar Pine Saplings on Crocker Ridge in an Area of Stagnated Reproduction.
. . . . . C. R. Quick

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1945

By

Frank O. Walters, Assistant Regional Leader
H. Miller Cowling, Photographic Specialist

During the war years it has been possible to adequately maintain all the essential elements of the educational and photographic section. It is hoped that in the future some expansion of these facilities will be possible.

The photographic section extends its services to the Sugar Pine Region and to Pear Psylla Control.

A. Photographic Section

The purpose of this section is: (1) To maintain a pictorial record of control and investigative work, (2) to supply photographs, charts, maps and manuals for facilitating the field work, and (3) supply material for educational work.

Photographic work in the field was considerably restricted due to the press of other work during the forepart of the season. Numerous fires and inclement weather during the balance of the season imposed further restrictions on photographic work.

Due to their rated importance, however, all current series pictures were covered. There are now 34 separate series pictures in progress showing both the growth of white pine under variable conditions as well as the progress of the disease on white pine. Series pictures are taken from the same point of the various subjects in periodic series from three months to two years depending upon the subject's progress requirements. One series of pictures showing the natural regeneration of white pine following logging is now in its fifteenth year and records some very valuable forestry data.

Although photography is the major project of this section, other operations are Multilith offset printing, black-line printing and mimeograph work. A summary of the 1945 work is given in the following table:

PHOTOGRAPHIC, MULTILITH, BLACK-LINE AND MIMEOGRAPH WORK

Item	North-western Region	Sugar Pine Region	Pear Psylla Control	Total
PHOTOGRAPHIC				
Lantern slides, natural color	78			78
Films developed, rolls and packs	4		1	5
Films developed, field films	210			210
Copies, 5x7	26	6	123	155
8x10	1		6	7
Printing, 4x5 or smaller		85	6	91
5x7	2,429	247	58	2,734
8x10		24		24
9x11	69	25	98	192
Enlarging, 5x7			67	67
11x14		6	11	17
14x17			15	15
30x40			11	11
Total Items	2,817	393	396	3,606
MULTILITH				
Copies	35	199	6	240
Plates made	35	136	4	175
Cards printed	800	3,600	11,800	16,200
Cards printed, reverse	800	3,600	11,800	16,200
Total cards	1,670	7,535	23,610	32,815
Paper printed	18,050	36,050	12,800	66,900
Paper printed, reverse	14,000	21,000	2,000	37,000
Total paper	32,050	57,050	14,800	103,900
Total Items	33,790	64,920	38,420	137,130
BLACK-LINE PRINTER				
Total maps printed	684		2,150	2,834
MIMEOGRAPH				
Total paper	16,085			16,085
Grand Total All Items	53,376	65,313	40,966	159,655

B. Educational Section

A conscientious effort is made by all members of the permanent staff to give comprehensive information concerning the blister rust problem to the personnel of the various camps. As the workers are gathered from all parts of the country, a wide dissemination of information is thus secured. This is a part of on-the-job training intended to give the workers a fundamental understanding of their jobs.

1. Bulletins and posters. Literature was made available to all camp personnel. One hundred eighty-six bulletins and pamphlets were passed out to persons calling at the Spokane office.

2. Talks, slides and motion pictures. A narrative has been prepared for the western Blister Rust motion picture, revising it for a sound film. An outline for a training film depicting the methods and techniques of the eradication job has been worked out. The western Blister Rust film will be used to give the workers an over-all picture of the job. The training film will show them how to do the job.

   During the past season the western film was shown in 37 Bureau and Forest Service camps, and to 5 outside organizations by the photographer. In all, the picture was shown to audiences totaling 2,505 people.

   At the county fair in Coeur d'Alene, by using the Balopticon, a series of blister rust slides was shown to a large number of people.

APPROPRIATIONS
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NORTHWESTERN REGION OF BLISTER RUST CONTROL

Regular Appropriations

Fiscal Year 1945:

Project 3101.14 (Administrative)	$ 97,675.00	
Project 3103.14 (Cooperative)	64,870.00	
		$162,545.00

Fiscal Year 1946: (as of 12/31/45)

Project 3101.14 (Administrative)	$ 92,000.00	
Project 3103.14 (Cooperative)	210,000.00	
		$302,000.00

Contributed Funds (deposited with U. S. Treasury)

Clearwater Timber Protective Association	$ 6,413.72	
Potlatch Timber Protective Association	5,174.28	
Priest Lake Timber Protective Association	4,235.26	
		$ 15,823.26

TABLE 1

FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL, CALENDAR YEAR 1945, REGULAR APPROPRIATIONS

	Project	Salaries	Expense	Total
	January 1 to June 30, 1945			
I	Planning, Coordination, Technical Direction			
	1.1 - Clearwater Operation, Idaho	$ 8,827.48	$ 1,545.19	$10,372.67
	1.2 - St. Joe Operation, Idaho	10,793.94	1,493.93	12,287.87
	1.3 - Coeur d'Alene Operation, Idaho	1,761.80	48.78	1,810.58
	1.4I - Kaniksu Operation, Idaho	7,050.16	1,590.95	8,641.11
	1.6C - Cabinet Operation, Montana	785.66	61.68	847.34
	1.6K - Kootenai Operation, Montana	1,178.50	92.52	1,271.02
	1.7G - National Park, Glacier	274.18	54.00	328.18
	1.7R - National Park, Rainier	176.18	37.25	213.43
	1.7Y - National Park, Yellowstone	196.02	124.89	320.91
	1.A - Office Maintenance	9,157.54	2,666.65	11,824.19
	1.B - Supervision	5,128.20	226.87	5,355.07
	1.C - Education and Information	3,284.26	157.00	3,441.26
	1.D - Control Investigations	272.04	26.78	298.82
	1.E - Methods Development		6.79	6.79
	Total, Project I, Jan. 1-June 30, 1945	$48,885.96	$ 8,133.28	$57,019.24
III	Cooperative Ribes Eradication on State and Private Lands			
	3.1 - Clearwater Operation, Idaho	2,530.12		2,530.12
	3.2 - St. Joe Operation, Idaho	1,287.12		1,287.12
	3.4 - Kaniksu Operation, Idaho	2,154.16		2,154.16
	Total, Project III, Jan. 1-June 30, 1945	$ 5,971.40		$ 5,971.40
	July 1 to December 31*, 1945			
I	1.1 - Clearwater Operation, Idaho	4,472.27	336.40	4,808.67
	1.2 - St. Joe Operation, Idaho	6,143.66	682.81	6,826.47
	1.3 - Coeur d'Alene Operation, Idaho	1,326.21	106.78	1,432.99
	1.4 - Kaniksu Operation, Idaho	**1,008.57	256.78	1,265.35
	1.6C - Cabinet Operation, Montana	# 148.46	97.00	245.46
	1.6K - Kootenai Operation, Montana	# 148.46	97.00	245.46
	1.7G - National Park, Glacier	672.47	115.50	787.97
	1.7R - National Park, Rainier	442.05	91.85	533.90
	1.7Y - National Park, Yellowstone	1,059.01	260.78	1,319.79
	1.A - Office Maintenance	9,772.93	2,531.80	12,304.73
	1.B - Supervision	5,304.55	419.88	5,724.43
	1.C - Education and Information	2,051.84	135.60	2,187.44
	1.D - Control Investigations	877.11	48.54	925.65
	1.E - Methods Development		18.82	18.82
	Total, Project I, July 1-Dec. 31, 1945	$33,427.59	$ 5,199.54	$38,627.13
III	3.1 - Clearwater Operation, Idaho	26,574.20	5,378.02	31,952.22
	3.2 - St. Joe Operation, Idaho	33,394.41	6,875.32	40,269.73
	3.4 - Kaniksu Operation, Idaho	20,455.77	4,499.31	24,955.08
	Total, Project III, July 1-Dec. 31, 1945	$80,424.38	$16,752.65	$97,177.03

*Salaries and wages through December 29 only, the end of the 13th biweekly pay period, fiscal year 1946.

**Net amount after crediting repayment by the Forest Service of the salaries of H. A. Brischle and L. J. Easley for 7/1-29, 1945.

Net amount after crediting repayment by the Forest Service of the salary of A. S. Skoglund for 7/1-12/1, 1945.

TABLE 2

EXPENDITURES - 1922 TO 1945
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

State	Regular	Emergency*	Cooperative	Total
Idaho	$1,845,905.41	$3,472,982.33	$334,190.82	$5,653,078.56
Montana	237,294.68	285,153.90		522,448.58
Washington	248,973.31	564,312.47		813,285.78
Subtotal	$2,332,173.40	$4,322,448.70	$334,190.82	$6,988,812.92
Colorado	11,852.04	67,437.96		79,290.00
Wyoming	14,842.78	65,391.37		80,234.15
Subtotal	$ 26,694.82	$ 132,829.33		$ 159,524.15
Grand Total	$2,358,868.22	$4,455,278.03	$334,190.82	$7,148,337.07

* Emergency funds - ERA(WPA) $3,775,781.16; NIRA(PWA) $679,496.87

TABLE 3

SUMMARY OF EXPENDITURES FROM STATE AND PRIVATE FUNDS, 1928 - 1945, IDAHO

Year	State	Private	Total
1928	$ 2,518.55	$ 2,264.32	$ 4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
1941	7,542.73	15,756.40	23,299.13
1942	22,761.68	15,440.78	38,202.46
1943	12,252.13	386.68	12,638.81
1944	12,506.60	15,612.98	28,119.58
1945	6,287.68	5,111.03	11,398.71
Total	$193,499.32	$140,691.50	$334,190.82

Organization of the Northwestern Regional Office - 1945

1. Regional Leader in Charge, H. E. Swanson, Pathologist

2. Assistant Regional Leader, F. O. Walters, Pathologist

3. Cooperative Local Control:

   a. Clearwater Operation, Idaho:
      Operation Supervisor, H. J. Faulkner, Forester
      Checker Foreman, J. C. Gonyou, Field Aid
   b. St. Joe Operation, Idaho:
      Operation Supervisor, F. J. Heinrich, Pathologist
      Operation Supervisor, W. F. Painter, Pathologist
      Camp Superintendent, G. W. Schmaltz, Agent
      Special Duty Assistant, R. E. Myers, Agent
   c. Coeur d'Alene Operation, Idaho:
      Operation Supervisor, M. C. Riley, Forester
   d. Kaniksu Operation, Idaho-Washington:
      Operation Supervisor, H. A. Brischle, Pathologist
      Operation Supervisor, L. J. Easley, Agent
   e. Montana Operation:
      Operation Supervisor, A. S. Skoglund, Pathologist
   f. National Parks, Washington, Montana, Wyoming:
      Operation Supervisor, M. C. Riley, Forester
      Operation Supervisor, C. M. Chapman, Pathologist

4. Projects:

   a. Education and Information:
      H. M. Cowling, Photographic Specialist
   b. Methods Development and Control Investigation (BLR-1-6):
      V. D. Moss, Forest Ecologist
      J. F. Breakey, Pathologist
      C. R. Stillinger, Pathologist
      (Personnel assigned to Northwestern Region by H. R. Offord)

5. Business Administration and Clerical:

   a. E. G. Schmidt, Administrative Assistant
      E. K. LaPrey, Storekeeper
      L. C. Miller, Automobile Mechanic
   b. M. L. McWold, Administrative Assistant
      M. Wilson, Clerk
   c. M. M. McLean, Clerk-Stenographer
      H. G. Thompson, Clerk-Stenographer
      M. C. Yourt, Clerk-Stenographer
      M. M. Stephens, Clerk-Stenographer
   d. L. E. Klatt, Administrative Assistant, Personnel

Members of the Permanent Staff returned from Military Furlough:
CCM John C. Gynn, December 2, 1945; Capt. Edward L. Joy, January 7, 1946.

Members of the Permanent Staff on Military Furlough: Lt. Homer J. Hartman; Lt. Howard D. Langley; Major Albert L. Pence, Jr.; Yl/c Jean R. Pringle.

ANNUAL REPORT

ON

THE CONTROL OF WHITE PINE BLISTER RUST

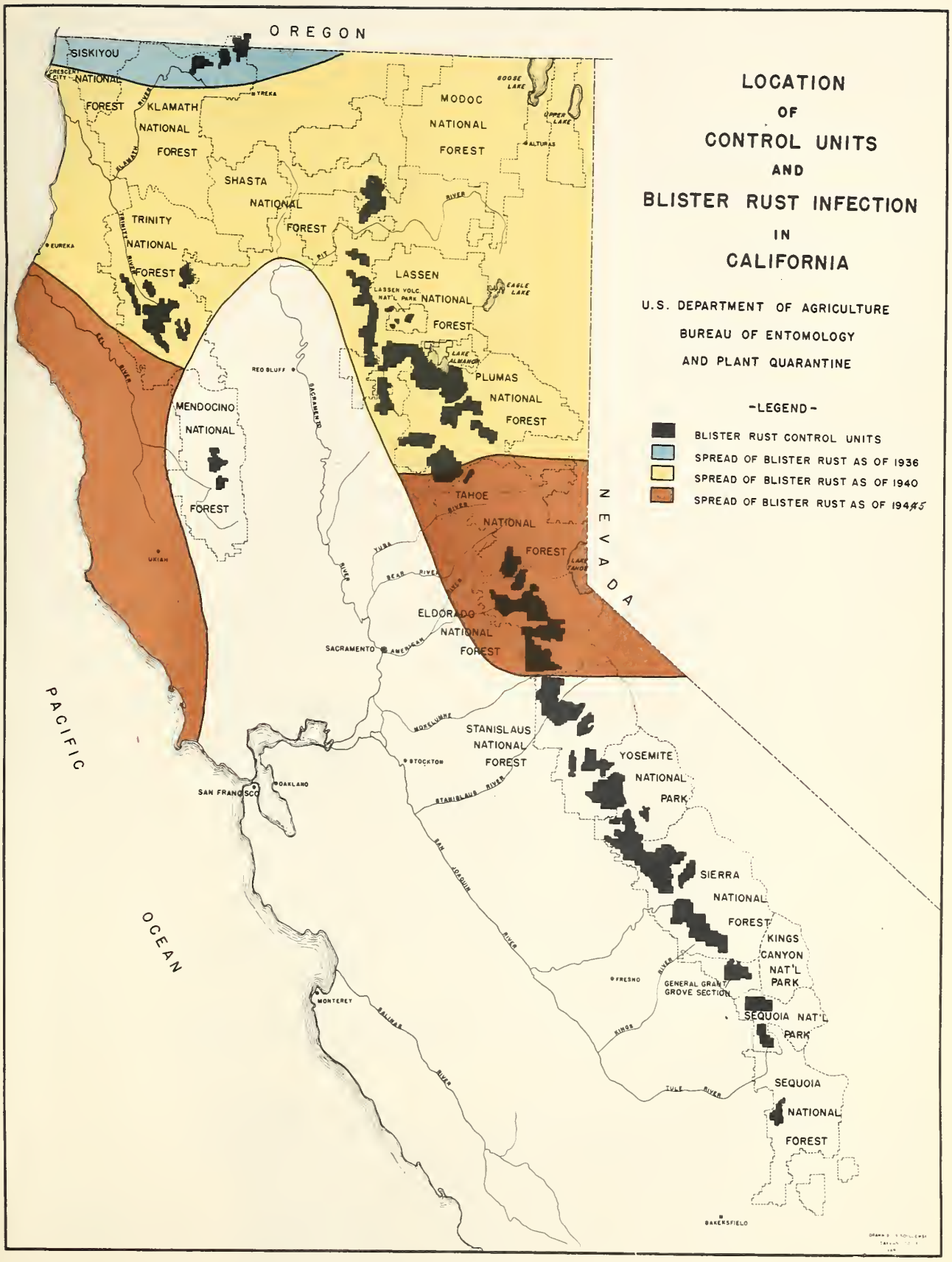
IN THE

PACIFIC COAST REGION

FOR THE

CALENDAR YEAR 1945

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Pacific Coast Regional Office
610 Syndicate Building
Oakland 12, California
February 1946


LOCATION
OF
CONTROL UNITS
AND
BLISTER RUST INFECTION
IN
CALIFORNIA
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
AND PLANT QUARANTINE
-LEGEND-
BLISTER RUST CONTROL UNITS
SPREAD OF BLISTER RUST AS OF 1936
SPREAD OF BLISTER RUST AS OF 1940
SPREAD OF BLISTER RUST AS OF 1945
OREGON
NEVADA
PACIFIC
OCEAN
SISKIYOU
NATIONAL
FOREST
KLAMATH
NATIONAL
FOREST
SHASTA
NATIONAL
FOREST
TRINITY
NATIONAL
FOREST
MODOC
NATIONAL
FOREST
LASSEN
NATIONAL
FOREST
PLUMAS
NATIONAL
FOREST
MENDOCINO
NATIONAL
FOREST
TAHOE
NATIONAL
FOREST
ELDORADO
NATIONAL
FOREST
STANISLAUS
NATIONAL
FOREST
YOSEMITE
NATIONAL
PARK
SIERRA
NATIONAL
FOREST
KINGS
CANYON
NAT'L
PARK
GENERAL GRANT
GROVE SECTION
SEQUOIA NAT'L
PARK
SEQUOIA
NATIONAL
FOREST
CRESCENT CITY
YREKA
EUREKA
UKIAH
RED BLUFF
SACRAMENTO
SAN FRANCISCO
OAKLAND
STOCKTON
MONTEREY
FRESNO
BAKERSFIELD
ALTURAS
GOOSE LAKE
UPPER LAKE
EAGLE LAKE
LASSEN VOLC. NAT'L PARK
LAKE ALMANOR
LAKE TAHOE
KLAMATH RIVER
TRINITY RIVER
EEL RIVER
PIT RIVER
SACRAMENTO RIVER
TUBA RIVER
BEAR RIVER
AMERICAN RIVER
MOKELUMNE RIVER
STANISLAUS RIVER
SAN JOAQUIN RIVER
KINGS RIVER
TULE RIVER
SALINAS RIVER

C O N T E N T S

Page

WHITE PINE BLISTER RUST CONTROL IN THE PACIFIC COAST REGION

ANNUAL REPORT FOR 1945

PART I

HIGHLIGHTS OF 1945

By

Warren V. Benedict, Regional Leader

This general summary lighlights the blister rust control season of 1945, covering such points as (1) what did the disease do this year, (2) what were the annual control accomplishments and the problems encountered, (3) what is the general status of the control job, and (4) what is the outlook for the future.

Spread of the Rust

Climatic and other factors necessary for the spread and intensification of white pine blister rust were generally unfavorable during the spring and summer of 1945 in the Pacific Coast Region. Heavy rains occurred throughout May in southern Oregon and northern California when aeciospores were being dispersed. Judging from scouting results it appears these rains were of such intensity as to wash many of the spores from the air before they could be carried very far from the infected pines. Probably also, many spores were germinated in the aecial pustules. There were a few local spots where the disease reached an intensification comparable to the heavy intensification of 1944. The one outstanding area where heavy rust intensification on ribes did occur was the locality from the East Fork of Indian Creek to the Slater Butte Road in the western part of the Klamath National Forest. Thousands of bushes of Ribes sanguineum in this area had from 50 to 100 per cent of their leaves covered with telia. Elsewhere on this forest ribes infection was generally light, even on the highly susceptible R. sanguineum growing in the vicinity of numerous sporulating cankers.

In the Sierra Nevada on the southern Eldorado and northern Stanislaus National Forests there was some evidence of a southward spread of the rust from pines to ribes. The determinations of the rust samples showing blister rust characteristics for the Stanislaus were not positive, so that the presence of the disease on that forest is still questionable. Two samples collected from the southern Eldorado were identified definitely as Cronartium ribicola. Thus for the second consecutive year blister rust was found on the southern Eldorado.

One rusted leaf collected from a R. petiolare bush growing beside Silver Creek in the southern Warner Mountains in the Modoc National Forest (Sec. 15, T. 38 N., R. 16 E., Modoc County) extended the known range of the disease eastward in northern California. This is the first time blister rust has been found on either host on this forest.

Numerous infected ribes were found at or near the pine infection centers on the northern end of the Lassen. During 1945 the rust appears to have intensified to a greater extent on ribes at the northern end of the Lassen and southern end of the Shasta National Forests than it did in either the southern Cascades or northern Sierra Nevada.

Four new pine infection centers were located during the summer. All were within the known limits of blister rust as previously determined. They are located by township and county as follows:

County	Forest	Sugar Pine Infection Centers 1945 Discovery
Butte	Lassen	Dogwood Creek - T. 23 N., R. 5 E., Sec. 18
Plumas	Plumas	Rock Creek - T. 24 N., R. 9 E., Sec. 32
Shasta	Shasta	Indian Creek - T. 37 N., R. 1 E., Sec. 3
Siskiyou	Shasta	Shovel Creek - T. 47 N., R. 3 W., Sec. 25

These centers were all of 1938 origin, and although new cankers had appeared since then, the buildup of the disease could not compare in intensity with that which occurred on the Klamath National Forest. The pine infection at these centers was destroyed.

Pinyon rust on ribes was fairly abundant from the southern end of the Eldorado National Forest southward through the Sierra National Forest. Few bushes infected with pinyon rust were found north of the Eldorado.

Control Accomplishments During 1945

Through the Lea Act of 1940 the Federal Government has provided enabling legislation that makes possible the application of measures to control blister rust on public and private white pine forests. The legislation has been implemented through the appropriation of funds in the annual appropriation acts of the U. S. Department of Agriculture. Under this act the Bureau of Entomology and Plant Quarantine is given the responsibility for the over-all leadership, technical direction, and coordination of the control program, and for the conduct of work on state and private lands in cooperation with state officials and land owners. The Federal Forest Service, the National Park Service, and the Oregon and California Revested Lands Administration of the General Land Office are responsible for the conduct of control operations on the public lands under their jurisdiction.

In 1945 these operating agencies continued control work on lands falling to their responsibility. During the peak of the season 1,620 workers housed in 33 camps were engaged in control work in the Region, distributed by operating agency as follows:

Agency	No. Camps	No. Workers
U. S. Forest Service	15	635
*National Park Service	5	300
O & C Revested Lands Administration	2	110
**EPQ - Coop.	11	575

*One National Park Service camp of 40 workers was operated by the Bureau on a reimbursement basis.

**Cooperative work on lands largely in state and private ownership by the Bureau of Entomology and Plant Quarantine, the State of California, the Diamond Match Company, the Michigan-California Lumber Company, and the Winton Lumber Company.

The 1945 season was in many respects a repetition of 1944. The labor situation along the West Coast continued critical due to war activities, and for the third season we had to rely for labor largely on 16 and 17 year old school boys. Convicts were employed again to a limited extent, one camp of delinquent youths was used for the first time, and near the end of the season we were successful in obtaining from the Office of Labor the assignment of about a hundred Mexican National agricultural workers during a lull in farm activity. All this labor was definitely substandard on control work, although the Mexican Nationals, for the short time they were available, proved to be the most effective.

All available sources of workers not needed in war activities were drawn upon to the utmost, and only early in the season were all camps completely manned. Competent woods supervisors and camp cooks were particularly hard to get. Efforts were made to employ ex-servicemen but only a few were to be had. Since school boys made up the bulk of the labor and left the job in late August to return to school, many of the camps were in operation little more than two months. Of particular significance was the abnormal amount of interruption to project work resulting from repeated demands made upon blister rust control crews for fire-fighting duty. Several of the camps spent more than half the work season on fire suppression work and all of them had their regular control work interrupted to some extent.

Food rationing and shortages were the most stringent and restrictive of any of the years of wartime operation, and it was difficult all season to keep the camps adequately supplied with food and other essentials.

Nonetheless, substantial progress was made in ribes eradication work, for with 1,358 fewer effective man days available for project work the area treated during 1945 exceeded by 8,758 acres that covered during 1944.

Accomplishments in 1945 by agency were as follows:

TABLE 1

SUMMARY OF RIBES ERADICATION WORK IN 1945

Operating Agency	Expenditures	Acres Worked		Ribes Destroyed	8-Hour Man Days Expended
		Initial Erad.	Reeradication		
U. S. Forest Service	$352,555	8,473	18,514	2,775,161	23,166
National Park Service	104,322	6,113	8,743	948,309	10,786
O & C Rev. Lands Adm.	59,510	1,245	1,712	112,994	3,104
Bureau-Coop.	* 276,414	7,172	10,574	2,119,055	14,568
Totals	$792,801	23,003	39,543	5,955,519	51,624

*Of the total of $276,414 expended by the cooperative project, $249,070 was Federal Lea Act funds for matching expenditures made by State and others, $22,234 was State of California funds, and $5,110 was lumber company funds.

The promising experimental results of 2-4-D as a ribicide, particularly on Ribes roezli, has opened up the field for using spraying equipment in eradicating ribes. While hand eradication will remain the principal method of destroying ribes, the use of 2-4-D shows real promise in areas where ribes are numerous and where their eradication by hand means is difficult, tedious, and costly.

As a result of the 1945 experiments with 2-4-D, both power and hand spraying equipment will be given wide-scale field tests in 1946 to determine costs of spraying ribes as against costs of hand eradication and also what areas can be worked more profitably by chemical methods than by hand or mechanical methods.

As pointed out in previous reports, the intermingled pattern of land ownership prevailing in the sugar pine region is such as to make it impracticable for each operating agency consistently to work only its own holdings. Also, ownership is not static, but is constantly changing. Under these circumstances it is necessary for each operating agency to work some interspersed lands of other ownerships. Work areas are, however, laid out to make these exchanges as compensating as possible. During 1945 the ownership of lands worked by operating agency was as follows:

TABLE 2

OWNERSHIP OF LANDS WORKED IN 1945

Operating Agency	Total Acres Worked	Recapitulation of Acres Worked by Ownership			
		National Forest Lands	National Park Lands	O & C Revested Lands	State and Private Lands
U. S. Forest Service	26,987	16,022	-	1,563	9,402
National Park Service	14,856	-	14,856	-	-
O & C Rev. Lands Adm.	2,957	1,329	-	1,348	280
Bureau-Coop.	17,746	4,414	-	-	13,332
Totals	62,546	21,765	14,856	2,911	23,014

Status of Control

Blister rust control work has been in progress in the Pacific Coast Region since 1933. In this twelve-year period we have covered initially slightly better than 37 per cent of the total of 2,571,712 acres of white pine lands now set up in control units, and the over-all job of ribes suppression including such successive reworkings as are necessary is about one-fifth completed.

TABLE 3

STATUS OF CONTROL WORK IN THE PACIFIC COAST REGION-1945

Land Ownership	Acreage in Control Units	Acres Worked		Ribes Destroyed	8-Hour Man Days Expended
		Initial Erad.	Reerad-ication		
National Forest Land	1,109,399	386,631	238,818	88,018,297	418,264
National Park Land	287,694	95,259	26,235	19,896,005	140,717
O and C Revested Lands	129,709	40,659	1,118	931,419	13,294
Total Federal Lands	1,526,802	522,549	266,171	108,845,721	572,275
State and Private Lands	1,044,910	452,693	195,193	66,698,415	352,763
Totals	2,571,712	975,242	461,364	175,544,136	925,038

Expenditures and Costs

Expenditures on ribes eradication work during 1945 are shown in Table 1.

For control work done to date, the cost of an effective 8-hour man day of work has averaged $7.57. Because of the rise in wages, the generally higher price level of 1945, and the short work season over which to prorate camp operating costs, the cost per man day has risen above the average. In 1945 it was $13.68.

The cost of ribes eradication work to date has averaged $4.87 per acre. In 1945 the per acre cost was $11.29.

Conclusion

With the limited amount of labor, and that of poor quality, and the short work season the accomplishments of 1945 fell far short of what is needed to meet the annual requirements of the job. In face of trends in rust spread and development, the sharp increase in acreage of cut-over lands on which ribes regeneration has been heavy and will be persistent, and the large acreage on which no work has as yet been undertaken, the annual coverage for the next several years should approximate 1/2 million acres, much of which should be on cut-over lands.

During the period of curtailed work for the war years every possible effort was made to apply the limited facilities where they would do the greatest immediate good. We were concerned primarily in holding gains already made and in delaying rust development. The program of ribes eradication in sites best suited to its entrance and development combined with the destruction of the incipient pine infection centers in such sites has paid noticeable dividends as a delay measure in retarding rust advance. Insofar as the available evidence indicates, the pine infections established in the northern Sierra Nevada as a result of the long-distance spread of the rust to ribes in 1938 and 1939 have been pretty well arrested by this spot-working method of direct attack.

Some ground has been lost during each of the war years, but in every instance the more valuable areas and those most urgently in need of ribes removal were treated.

No adequate progress in over-all attack can be expected until the necessary man power becomes available. The ending of the war late in 1945 should release the needed labor, and current fiscal year funds have been so budgeted as to permit a sharp expansion in the field program of 1946.

If a post war program, ample in size to complete all remaining initial work and at the same time to handle the reworking when due, develops promptly and extends over about the next ten years, there is every reason to believe the white pine blister rust can be effectively controlled on all important sugar pine sites in this Region with but slight pine losses.

PART II

LEADERSHIP, COORDINATION, AND TECHNICAL DIRECTION OF BLISTER RUST CONTROL BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Work Project BLR-1-5

By

Benton Howard, Forester, P-3

PURPOSE

Blister rust control work is conducted by several Federal agencies each on the lands within its jurisdiction. The Bureau of Entomology and Plant Quarantine has been charged by Congress with responsibility for the leadership, coordination, and technical direction of all blister rust control work.

ORGANIZATION

The objectives of the project were accomplished by the members of the Bureau's office at Oakland, California. Staff members conferred with representatives of the cooperating agencies and with them coordinated control plans. Technical advice and assistance were given cooperators during the year.

Staff of the Oakland Office in 1945

Warren V. Benedict, Forester, P-5.	Regional Leader in Charge
Thomas H. Harris, Forester, P-4.	Assistant Regional Leader

Control Operations

a. Oregon and the Klamath National Forest of California

Douglas R. Miller, Forester, P-3	Operation Supervisor
Lyle N. Anderson, Agent, P-2	Assistant Operation Supv.
Lawrence P. Winslow, Agent, P-2	Assistant Operation Supv. (On loan by the Berkeley Office)
Conrad P. Wessela, Forester, P-3	Operation Supervisor (Restored to duty December 17 following military furlough)

b. Lassen and Plumas National Forests, Lassen Volcanic National Park

Benton Howard, Forester, P-3	Operation Supervisor
E. Ross Ellis, Agent, P-2	Assistant Operation Supv.
Warren S. Burrill, Forester, P-2	Checking Supervisor

c. Eldorado National Forest

Robert Sovulewski, Agent, P-3	Operation Supervisor

d. Stanislaus National Forest

Carl W. Fowler, Forester, P-3	Operation Supervisor
R. Riggs Johnston, Field Asst., SP-7. .	Checking Foreman

e. Sierra National Forest, Yosemite and Sequoia-Kings Canyon National Parks

Frank A. Patty, Pathologist, P-3. . . .	Operation Supervisor
John N. Mitchell, Forester, P-2	Assistant Operation Supv.

Scouting and Disease Surveys

Douglas R. Miller, Forester, P-3. . . .	Project Leader

Business Administration

Paul A. Auge	Administrative Assistant, CAF-9 (on temporary detail from Milwaukee Office beginning July 29; transfer to Pacific Coast Region effective November 28, 1945)
Orvis R. Decious.	Administrative Assistant, CAF-7
Juliana Arca	Clerk, CAF-4
Marion A. Bruun	Clerk, CAF-4
Aretta D. Miller.	Clerk-Stenographer, CAF-4
Roberta J. Bruun.	Clerk-Stenographer, CAF-3
Mabel L. Louie	Clerk-Typist, CAF-3
Mabel E. Rothe	Clerk-Stenographer, CAF-3 (appointed May 1, 1945)
Katherine W. Kohn	Clerk-Typist, CAF-2 (appointed by transfer August 20, 1945, separated by transfer November 28, 1945)
Hulda H. Penn	Clerk-Typist, CAF-2 (temporary appointment effective November 18, 1945)
Marguerite Stewart	Clerk-Typist, CAF-2 (resigned April 15, 1945)
Richard F. Leahy	Storekeeper, CAF-6
William R. Nordin	Automobile Mechanic, CPC-7 (temporary appointment effective November 19, 1945)

Development and Improvement of Methods for the Far Western Regions

Harold R. Offord. . . . . Pathologist, P-4, In Charge

Berkeley, California, Office

Clarence R. Quick . . . . . Forest Ecologist, P-3
Lawrence P. Winslow . . . . . Agent, P-2
Catherine Ryan . . . . . Clerk-Stenographer, CAF-3

Spokane, Washington, Office

Virgil D. Moss. . . . . Forest Ecologist, P-3
John F. Breskey . . . . . Pathologist, P-2
Charles R. Stillinger . . . . . Pathologist, P-2

Rates of Pay

Bureau wage rates prior to July 1, 1945 for seasonal workers were the same as those appearing in the 1943 and 1944 annual reports. Subsequent to July 1, 1945, the wage rates for the 44-hour work week were as follows:

Pay Roll Title	Field Title	Biweekly Base Pay	Biweekly Overtime Allowance	Biweekly Gross Pay
Field Supervisor, SP-7	Camp Supt.	$101.92	$15.29	$117.21
Field Supervisor, SP-6	Foreman	89.23	13.38	102.61
Field Supervisor, SP-5	Asst. Foreman	80.76	12.12	92.88
Field Aid, SP-5	Assistant to Operation Supv.	80.76	12.12	92.88
Principal Inspector, SP-7	Checker Foreman	101.92	15.29	117.21
Inspector, SP-6	Senior Checker	89.23	13.38	102.61
Inspector, SP-5	Junior Checker	80.76	12.12	92.88
Cook, Unallocated	Cook, first	89.23	13.38	102.61
Cook, Unallocated	Cook, second	85.00	12.75	97.75
Cook, Unallocated	Cook, small camp	73.15	10.97	84.12
Laborer, unskilled	Crewleader	63.00	9.45	72.45
Laborer, unskilled	Crewman	57.92	8.69	66.61
Laborer, unskilled	Flunky	63.00	9.45	72.45
Laborer, unskilled	Flunky	60.46	9.07	69.53
Clerk, CAF-3	Camp Clerk	73.15	10.97	84.12

WORK PERFORMED

Leadership and Coordination

The Bureau correlated the activities of the various agencies engaged in blister rust control work. The staff collaborated in the planning of projects and assisted in directing the various programs.

The following agencies engaged in or contributed to the control of white pine blister rust during 1945:

1. Agencies engaged in control work.

   a. United States Department of Agriculture

      (1) Bureau of Entomology and Plant Quarantine
      (2) Forest Service

   b. United States Department of the Interior

      (1) National Park Service
      (2) Oregon and California Revested Lands Administration

2. Agencies participating financially in the cooperative control project.

   a. State of California (Division of Forestry, Department of Natural Resources). Appropriations have been made since 1941. The one for the biennium July 1, 1943 to June 30, 1945 was $100,000 and the one for July 1, 1945 to June 30, 1947 is $150,000.

   b. Diamond Match Company. Since 1942 the company has made a yearly contribution of $2,000.

   c. Michigan-California Lumber Company. Since 1942 the company has made a yearly contribution of $2,000.

   d. The Winton Lumber Company. The company entered the cooperative project with a contribution of $1,000 for the fiscal year 1946.

3. Agencies contributing facilities and services under Memoranda of Agreement with the Bureau of Entomology and Plant Quarantine:

   a. State of California

      (1) Department of Agriculture
      (2) College of Agriculture, University of California
      (3) Botanical Garden, University of California

   b. State of Oregon

      (1) Oregon State Board of Forestry
      (2) Division of Plant Industry, Department of Agriculture

Funds from the State of California's biennial appropriations were available for use during 1945. The Diamond Match Company and the Michigan-California Lumber Company each contributed $2,000 and the Winton Lumber Company $1,000 for control work. These funds were matched dollar-for-dollar by Federal funds as authorized by the Lea Act of 1940, and were expended on the cooperative project for control work on private and state lands. The Memoranda of Agreement (or Understanding) defining the relationships and responsibilities between the Bureau and the several cooperating agencies, except the Department of the Interior, were continued.

The following "Memorandum of Understanding between the Department of the Interior and the Department of Agriculture" was executed on June 21, 1945 by the respective secretaries in order to allow the maximum of latitude between the field offices in arranging a cooperative program.

MEMORANDUM OF UNDERSTANDING
between the
UNITED STATES DEPARTMENT OF THE INTERIOR
and the
UNITED STATES DEPARTMENT OF AGRICULTURE

The control of white pine blister rust is essential to the survival, reproduction, and maintenance of the white or five-needled pines in the forests of the Nation. These trees are highly valued over extensive areas for forestry, watershed, recreational, and esthetic purposes. All eight species of white pines native to this country are subject to lethal attack by the blister rust fungus, now present in 28 States. This is a matter of great concern to administrators of public and private lands responsible for forest protection and conservation. The impairment of the forest resources of the Nation by this disease and the menace it presents to the national welfare have been recognized by the enactment of legislation, commonly referred to as "The Lea Act of April 26, 1940" (54 Stat. 168), which authorizes the Secretary of Agriculture to use Federal funds to control, eliminate, or prevent the spread of white pine blister rust on all forested lands.

To implement this legislation, annual acts providing appropriations to the Department of Agriculture carry funds for white pine blister rust control and indicate the amounts of these funds that are to be used by the Department of the Interior for work on Federal lands under its jurisdiction, by the Forest Service of the Department of Agriculture for work on national forest lands, and by the Bureau of Entomology and Plant Quarantine of the Department of Agriculture for coordination of the entire program.

The basic plan for control of white pine blister rust outlined above from legislation enacted by the Congress requires close cooperation between the several responsible bureaus and agencies of the Federal Government that are participating in this work. Forest lands in different ownerships often are intermingled in checkerboard fashion, necessitating coordinated and integrated action programs on lands subject to the respective administrative authorities of Federal, State, and private agencies in order to achieve the objectives set forth by the Congress. In recognition of these facts it appears advisable for the two Departments to agree in broad general terms on the basic principles necessary and desirable to effectuate the fullest cooperation in the performance of white pine blister rust control. Therefore it is mutually agreed:

1. That the two Departments and the field representatives thereof will, under the legal, fiscal, and other limitations respectively governing each, cooperate fully and freely in the exchange of information relating to the control of white pine blister rust and

in the planning, development, and coordination of field operations, and that in carrying out such cooperation the basic principles established by existing legislation shall be the guiding influence.

2. That in bringing about this desired cooperation the Department of the Interior and the Department of Agriculture authorize their respective bureaus and agencies concerned with the control of white pine blister rust to collaborate and to develop and execute coordinated work programs which eliminate duplication of effort, to the end that the activities and responsibilities of the respective bureaus and agencies concerned will be conducted in such a manner as to accomplish the maximum benefit to the public at the least cost. To effectuate these objectives of mutual concern, responsible field officers of both Departments may enter into understandings with one another for carrying out detailed working arrangements.

3. That this Memorandum of Understanding shall become effective upon the date of approval and shall continue in effect until 30 days after written notice of a desire to terminate it is served on either of the signatories by the other.

Signed: Harold L. Ickes
Secretary of the Interior.

Date: May 11, 1945.

Signed: Claude R. Wickard
Secretary of Agriculture.

Date: June 21, 1945.

Labor recruitment for the season was difficult. Available workers came almost entirely from the high schools of California and were largely inexperienced, since very few boys from the 1944 season returned. Every effort was made to secure veterans and other adult labor, but few were willing to accept such temporary employment. Experienced supervisory personnel were insufficient to meet the season's needs and it was necessary to hire totally inexperienced school teachers as superintendents and foremen in some camps. Letters seeking applicants were sent to schools throughout California and to many other points in the country. The Forest Service, Bureau, Civil Service Commission, United States Employment Service, and the Division of Forestry of the State of California all cooperated in securing the personnel needed to man the camps. The Bureau recruited all personnel for the National Park Service camps. Replacements were not available during the latter part of August and some camps were closed because insufficient workers remained in them to allow for satisfactory operation.

Technical Direction of Ribes Eradication

The Bureau's staff furnished its services to the cooperating agencies in advising, planning, inspecting, and assisting in the operation of the various field programs. Because of the wartime absences of their blister

rust staff men, the Klamath, Eldorado, Stanislaus, and Sierra National Forests called upon the Bureau for assistance in supervising their blister rust control camps and field work.

The spot working of areas and the removal of cankers were continued as measures to delay the spread of the rust until adequate labor is available for the ribes eradication work needed to establish control.

Checking

All checking work is the responsibility of the Bureau. The entire checking force was hired by and worked under the supervision of the Bureau on all operations. The Bureau was reimbursed for the salaries of checkers assigned to the projects of other agencies.

A total of 50 persons were hired as checkers. About 60 per cent were high school students and the remainder were college students and adults. In general, the work of the high school checkers was inferior to that of the older checkers.

Summaries of the checking work appear at appropriate places elsewhere in this report.

Preliminary Surveys

As it pertains to blister rust control, the preliminary survey made of an area is to ascertain the size, distribution, and number of sugar pines and ribes, the ground cover as it effects working conditions, and the approximate cost of control measures. This is a systematic survey and includes the preparation of culture maps and the securing of information on the presence of blister rust.

A survey of this type was conducted on a portion of the Pinehurst control unit of southern Oregon in order to determine the amount of sugar pine left, and the extent of ribes regeneration, following logging. As logging has brought in numerous ribes bushes since the area was worked initially in 1936, it is necessary to rework it as soon as conveniently possible. Information on both sugar pine and ribes was needed in order to determine the feasibility of continuing blister rust control on this area. The Bureau maintained a 4-man party for 5 weeks during which time a pine count and post check were made on 13,440 acres.

The Pinehurst control unit is immediately south of the Rogue River National Forest and lies midway between the towns of Ashland and Klamath Falls. The area examined is in T. 40 S., R. 5 E., Willamette Meridian. The land is neither steep nor brushy with the exception of Parker Mt., which is surrounded by a large brush field. Numerous abandoned logging railroads afford an excellent road system into all parts of the area. Prior to logging, there was a fine stand of sugar pine, yellow pine, Douglas fir, white fir, red fir, and incense cedar covering this district.

A severe logging disturbance, a heavy pine cut, and widespread slash fires have impaired the immediate productivity of the area. In some instances large areas of advance reproduction have been totally destroyed. Ribes bushes appeared to be permanently suppressed following the 1936 ribes eradication, but as a result of the logging disturbance ribes have regenerated over most of the area.

Usual standard checking methods, 12 to 16 strips were run per section. On four of these strips, spaced 20 chains apart, data were taken on ribes and on the dominant and codominant sugar pines. On the remaining strips only ribes and cultural data were taken.

The survey covered 13,440 acres. The area averages 63 dominant and codominant sugar pines per acre, which is in excess of the minimum stocking requirements when considering an area for protection against blister rust.

An average of only five ribes per acre are present but these are so generally scattered that ribes eradication crews will be required to cover practically all the ground. For example; a section that was entirely ribes-free in 1936 now requires more than 500 acres of crew work. Blister rust is present on ribes bushes both north and east of this area. Ribes lobbi was the only species encountered but numerous R. sanguineum are known to exist on the east edge of the control unit. One complete ribes eradication should again place most of this area on a maintenance basis.

AREA COVERED BY PRELIMINARY SURVEY
ON THE PINEHURST CONTROL UNIT
1945

Township	Range	Sections by Numbers	Totals	
			Sections	Acres
40 S.	5 E.	S½ 1, 2, and 3. All of 4 - 21 E½ of 29. All of 30	23	13,440

SUMMARY OF DATA

Acres	Per Acre					
	Dominant and Codominant Sugar Pines by Size Classes					Ribes
	0-6	6'-3.5"	3.5"-11.5"	11.5" +	Total	
13,440	45	14	3	1	63	5

Scouting for Blister Rust

This project is reported and summarized in Part VII, page 79 of this report.

FINANCIAL STATEMENTS

The 1945 calendar year control program was carried on in the Pacific Coast Region from regular Congressional appropriations to the Bureau and cooperating Federal agencies together with the State of California and private cooperators' cash contributions.

In financial Table 1 are shown the allotments made to the cooperating Federal agencies for expenditure in the Pacific Coast Region for the 1945 and 1946 fiscal years. Financial Table 2 shows the expenditures by the same agencies for the 1945 calendar year.

Financial Table 3 pertains only to expenditures of this Bureau and shows expenditures by project and appropriation symbol, and by State separated to show amounts expended for salaries and wages, and for other expenses. The amounts shown as salaries are the net payments after deductions for subsistence from the earnings of the employees. The cost of subsistence supplies is included under "Expenses". Also included as a part of this table are the expenditures of the Developmental and Investigative Unit headquartered at Berkeley, whose bookkeeping records are maintained and vouchers processed through the Oakland Regional Office. The expenditures of the Berkeley Unit include the salaries, expenses, and operating costs of two of its personnel headquartered at the Northwestern Regional Office at Spokane, Washington and one stationed at Moscow, Idaho.

Financial Table 4 (also shown as Table 7, page 53) shows the amounts contributed in cash by the State of California and the four cooperating lumber companies for ribes eradication in California and the amounts allocated by the Federal Government for the purpose of matching such contributions under the provisions of the "Lea Act", Public Law 486, 76th Congress. This table also shows the accumulative expenditures from "Lea Act" funds from July 1, 1941 through December 31, 1944; such expenditures during the period January 1 to December 31, 1945, and the balances available for expenditure as of January 1, 1946. The available Federal funds must be expended prior to July 1, 1946; the cash contributions from State and private sources remain available until expended.

Omnibus Table 3 presents a summary of expenditures for 1945.

TABLE 1

FISCAL YEAR ALLOTMENTS FROM WHICH FEDERAL EXPENDITURES WERE MADE IN THE PACIFIC COAST REGION DURING THE CALENDAR YEAR 1945

ALL REGULAR FUNDS

Agency	Fiscal Year 1945	Fiscal Year 1946*
Bureau of Entomology and Plant Quarantine	$ 168,256	$ 345,000
Forest Service, Region 5 (California)	300,000	300,000
Forest Service, Region 6 (Oregon)	72,500	70,000
National Park Service:		
Yosemite National Park	54,000	60,000
Sequoia-Kings Canyon National Park	39,200	21,000
Lassen Volcanic National Park	5,000	16,000
Oregon and California Revested Lands Administration	40,000	56,000
Total - Pacific Coast Region	$ 678,956	$ 868,000

*Figures in this column represent allotments as they are known as of December 31, 1945, and are subject to change until June 30, 1946.

TABLE 2

FEDERAL EXPENDITURES IN THE PACIFIC COAST REGION FOR THE CALENDAR YEAR 1945

REGULAR FUNDS

Agency	California Fiscal Year 1945 1/1/45-6/30/45	California Fiscal Year 1946 7/1/45-12/31/45	Oregon Fiscal Year 1945 1/1/45-6/30/45	Oregon Fiscal Year 1946 7/1/45-12/31/45	Region Total
Bureau of Entomology and Plant Quarantine	$ 43,458	$ 194,736	$ 5,993	$ 4,883	$ 249,070
Forest Service, Region V. . . .	76,527	197,225			273,752
Forest Service, Region VI . . .			27,605	51,198	78,803
National Park Service					
Yosemite National Park	16,999	52,578			69,577
Sequoia-Kings Canyon National Park	3,472	18,533			22,005
Lassen Volcanic National Park	975	11,765			12,740
Oregon and California Revested Lands Administration			18,812	40,698	59,510
Total - Pacific Coast Region	$ 141,431	$ 474,837	$ 52,410	$ 96,779	$ 765,457

TABLE 3

CLASSIFIED BUREAU EXPENDITURES BY STATE, APPROPRIATION SYMBOL, AND PROJECT

Pacific Coast Region - January 1 to December 31, 1945

Appropriation Symbol Project No.	Fiscal Year 1945 1252245(66).030		Fiscal Year 1946 1262245(66).003		12X8200(13).213*			Total
	3101.14	3103.14	3101.14	3103.14	X2132.14	X2133.14	X2134.14	
California								
Salaries	$29,985.78	$1,306.20	$30,867.71	$105,343.65	$15,661.80	$ 595.38	$2,044.14	$185,804.66
Expenses	6,639.14	5,526.44	8,095.97	50,428.57	6,572.91	1,456.70	1,013.34	79,733.07
Totals	$36,624.92	$6,832.64	$38,963.68	$155,772.22	$22,234.71	$2,052.08	$3,057.48	$265,537.73
Oregon								
Salaries	$ 5,455.48		$ 4,587.49					$ 10,042.97
Expenses	537.68		295.57					833.25
Totals	$ 5,993.16		$ 4,883.06					$ 10,876.22
Pacific Coast Region								
Salaries	$35,441.26	$1,306.20	$35,455.20	$105,343.65	$15,661.80	$ 595.38	$2,044.14	$195,847.63
Expenses	7,176.82	5,526.44	8,391.54	50,428.57	6,572.91	1,456.70	1,013.34	80,566.32
Totals	$42,618.08	$6,832.64	$43,846.74	$155,772.22	$22,234.71	$2,052.08	$3,057.48	$276,413.95

*Contributed cooperative funds: X2132.14 State of California, Division of Forestry $75,000; X2133.14 The Diamond Match Company $2,000; X2134.14 Michigan-California Lumber Company $2,000; X2136.14 The Winton Lumber Company $1,000, from which no expenditures were made during the calendar year.

D & I Unit**								
Salaries	$13,489.47		$12,681.38					$ 26,170.85
Expenses	1,395.71		746.15					2,141.86
Totals	$14,885.18		$13,427.53					$ 28,312.71

**Amounts shown in these columns represent expenditures of the Development and Investigative Unit headquartered at Berkeley from funds allocated directly to that Unit, but whose accounts and vouchers were processed by the Oakland Office.

TABLE 4

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION ON STATE AND PRIVATE LANDS IN CALIFORNIA - JULY 1, 1941 TO DECEMBER 31, 1945

Cooperative Funds	Accumulative Cooperative Contributions and Federal Appropriations 7/1/41-6/30/46	Accumulative Expenditures 7/1/41-12/31/44	Expenditures Calendar Year 1945	Available Balances as of 1/1/46
State and Private Cash Contributions:				
State of California	$ 225,000	$ 124,956	$ 22,235	$ 77,809
Michigan-California Lumber Co.	8,000	4,000	3,057	943
Red River Lumber Co.*	4,000	4,000		
Diamond Match Co.	8,000	4,000	2,052	1,948
Winton Lumber Co.	1,000			1,000
Total	$ 246,000	$ 136,956	$ 27,344	$ 81,700
Federal Allotments (Project 3103.14)				
1942 Fiscal Year	$ 14,625	$ 14,612		
1943 Fiscal Year	71,770	71,378		
1944 Fiscal Year	86,195	86,083		
1945 Fiscal Year	85,040	78,164	6,833	
1946 Fiscal Year	260,000		155,772	104,228
Total (Project 3103.14)	$ 517,630	$ 250,237	$ 162,605	$ 104,228
Grand Total	$ 763,630	$ 387,193	$ 189,949	$ 185,928

*Red River Lumber Company contributed only for 1943 and 1944 fiscal years.

NOTE: Expenditures in the amount of $38,645.78 were made during 1945 for emergency fire suppression at the call of the State of California, Division of Forestry, and the U. S. Forest Service. Reimbursements were made by these agencies to the Bureau blister rust control funds in the amount of $4,631.91 from the State of California and $34,013.87 from the Forest Service. These amounts were credited back to the funds from which expended and are a part of the balances shown available for expenditure.

TABLE 5
(Omnibus Table 4, Sheets 1 and 2)

SUMMARY OF EXPENDITURES - FEDERAL AND COOPERATIVE - 1945

State	Cooperative Funds			Total Federal Funds	Total All Funds	Federal Funds				
	Total (Direct and Indirect Aid)	Indirect Aid	Direct Aid			Entomology and Plant Quarantine		Forest Service	Park Service	O & C
						3101	3103			
California	$37,544	$10,200	$27,344	$616,268	$653,812	$75,589	$162,605	$273,752	$104,322	
Oregon	1,000	1,000		149,189	150,189	10,876		78,803		59,510
Totals	$38,544	$11,200	$27,344	$765,457	$804,001	$86,465	$162,605	$352,555	$104,322	$59,510

State	Cooperative Funds Direct Aid			Expenditures Chargeable to Ribes Eradication	Average Cost	
	State	Private	Total		Per Acre	Per Effective Man Day
California	$22,235	$5,109	$27,344	$568,023	$11.14	$13.46
Oregon				138,313	11.95	14.67
Totals	$22,235	$5,109	$27,344	$706,336	$11.29	$13.68

TABLE 6
(Omnibus Table F, Sheets 1 and 2)

SUMMARY OF EXPENDITURES FEDERAL AND COOPERATIVE - 1918*-1945

(Gross Figures Used)

State	Total Federal Funds		Total Cooperative Funds	Grand Total All Funds	Regular Funds			
	Regular	Emergency			Bureau (BPI & EPQ)	Forest Service	Park Service	O & C Revested Lands
California	$3,347,783	$3,449,752	$484,400	$7,281,935	$1,311,601	$1,642,683	$393,499	
Oregon	708,445	598,888	186,300	1,493,633	296,329	237,270		$174,846
Totals	$4,056,228	$4,048,640	$670,700	$8,775,568	$1,607,930	$1,879,953	$393,499	$174,846

State	Direct Aid			Indirect Aid	Total Cooperative Funds
	State	Private	Total		
California	$147,191	$17,109	$164,300	$320,100	$484,400
Oregon				186,300	186,300
Totals	$147,191	$17,109	$164,300	$506,400	$670,700

*No expenditures in the Pacific Coast Region prior to 1923.

REGIONAL SUMMARY TABLES

OF

RIBES ERADICATION AND OF CHECKING

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TABLE 1

THE STATUS OF RIBES ERADICATION IN THE PACIFIC COAST REGION AS OF DECEMBER 31, 1945

PART A - CALIFORNIA

Control Operation	Class of Ownership	Control Units: Total Acres	Control Units: Acres Unworked	Status of Ribes Eradication: First Working: Acres Worked	First Working: Man Days	First Working: Ribes Eradicated	Reeradication: Acres Worked	Reeradication: Man Days	Reeradication: Ribes Eradicated	Total All Workings: Acres Worked	Total All Workings: Man Days	Total All Workings: Ribes Eradicated
National Forests												
Mendocino	Federal	21,017	21,017									
	Private	15,179	15,179									
	State	48	48									
	Total -	36,244	36,244									
Trinity	Federal	122,575	122,575									
	Private	40,283	40,283									
	State	2,088	2,088									
	Total -	164,946	164,946									
Klamath	Federal	19,650	13,251	6,399	6,637	972,871	1,036	790	39,934	7,435	7,427	1,012,805
	Private	26,850	11,204	15,646	17,213	1,273,561	2,027	1,497	19,858	17,673	18,710	1,293,419
	Total -	46,500	24,455	22,045	23,850	2,246,432	3,063	2,287	59,792	25,108	26,137	2,306,224
Shasta	Federal	3,611	3,611									
	Private	74,151	74,151									
	Total -	77,762	77,762									
Lassen	Federal	69,172	57,682	11,490	6,958	1,313,289	2,252	731	44,893	13,742	7,689	1,358,182
	Private	243,921	202,948	40,973	27,833	4,111,128	14,179	5,638	630,593	55,152	33,471	4,741,721
	State	1,055	1,055									
	Total -	314,148	261,685	52,463	34,791	5,424,417	16,431	6,369	675,486	68,894	41,160	6,099,903
Plumas	Federal	186,585	101,343	85,242	62,956	11,928,214	44,831	26,570	2,835,394	130,073	89,526	14,763,608
	Private	125,630	53,163	72,467	57,466	11,246,028	44,610	25,458	3,350,778	117,077	82,924	14,596,806
	State	360	320	40	21	4,620				40	21	4,620
	Total -	312,575	154,826	157,749	120,443	23,178,862	89,441	52,028	6,186,172	247,190	172,471	29,365,034
Tahoe	Federal	19,925	19,925									
	Private	19,983	19,983									
	Total -	39,908	39,908									
Eldorado	Federal	117,725	50,802	66,923	33,498	9,566,625	41,377	24,695	1,846,019	108,300	58,193	11,412,644
	Private	126,507	38,654	87,853	54,179	13,404,714	50,318	27,607	2,433,705	138,171	81,786	15,838,419
	State	2,642	40	2,602	1,634	310,891	1,103	383	18,706	3,705	2,017	329,597
	Total -	246,874	89,496	157,378	89,311	23,282,230	92,798	52,685	4,298,430	250,176	141,996	27,580,660
Stanislaus	Federal	106,691	29,907	76,784	32,721	8,024,289	77,709	35,467	6,684,294	154,493	68,188	14,708,583
	Private	122,526	16,800	105,726	52,386	17,509,511	61,124	31,809	3,436,394	166,850	84,195	20,945,905
	State	407		407	129	16,768				407	129	16,768
	Total -	229,624	46,707	182,917	85,236	25,550,568	138,833	67,276	10,120,688	321,750	152,512	35,671,256
Sierra	Federal	175,391	126,686	48,705	88,169	18,133,056	37,576	29,369	9,538,871	84,281	117,538	27,671,927
	Private	49,082	32,926	16,156	24,382	5,708,223	6,965	4,414	938,755	23,121	28,796	6,646,978
	State	40	40									
	Total -	222,513	159,652	62,861	112,551	23,841,279	44,541	33,783	10,477,626	107,402	146,334	34,318,905
Sequoia	Federal	43,930	43,930									
	Private	18,880	18,880									
	Total -	62,810	62,810									
TOTAL ALL NATIONAL FORESTS	Federal	884,272	590,729	293,543	230,939	49,938,344	204,781	117,622	20,989,405	498,324	348,561	70,927,749
	Private	862,992	524,171	338,821	233,459	53,253,165	179,223	96,423	10,810,083	518,044	329,882	64,063,248
	State	6,640	3,591	3,049	1,784	332,279	1,103	383	18,706	4,152	2,167	350,985
	Total -	1,753,904	1,118,491	635,413	466,182	103,523,788	385,107	214,428	31,818,194	1,020,520	680,610	135,341,982
National Parks												
Lassen Volcanic	Federal	17,792	367*	17,425	5,679	756,696	3,040	1,561	123,705	20,465	7,240	880,401
	Private	140		140	55	14,977	15	6	738	155	61	15,715
	Total -	17,932	367*	17,565	5,734	771,673	3,055	1,567	124,443	20,620	7,301	896,116
Yosemite	Federal	143,790	85,827	57,963	88,214	12,855,438	19,281	23,646	3,222,181	77,244	111,860	16,077,619
	Private	2,510	2,510									
	Total -	146,300	88,337	57,963	88,214	12,855,438	19,281	23,646	3,222,181	77,244	111,860	16,077,619
Kings Canyon	Federal	22,430	17,996	4,434	6,497	994,702	2,601	1,978	213,233	7,035	8,475	1,207,935
Sequoia	Federal	99,900	88,095	11,805	12,395	1,578,256	963	254	8,202	12,768	12,649	1,586,458
TOTAL ALL NATIONAL PARKS	Federal	283,912	192,285	91,627	112,785	16,185,092	25,885	27,439	3,567,321	117,512	140,224	19,752,413
	Private	2,650	2,510	140	55	14,977	15	6	738	155	61	15,715
	Total -	286,562	194,795	91,767	112,840	16,200,069	25,900	27,445	3,568,059	117,667	140,285	19,768,128
State Parks												
Latour	Private	1,200	1,200									
	State	1,160	1,160									
	Total -	2,360	2,360									
Calaveras Big Trees	Private	120		120	21	3,260	75	20	722	195	41	3,982
	State	1,973	225	1,748	1,318	185,001	1,265	472	26,595	3,013	1,790	211,596
	Total -	2,093	225	1,868	1,339	188,261	1,340	492	27,317	3,208	1,831	215,578
TOTAL ALL STATE PARKS	Private	1,320	1,200	120	21	3,260	75	20	722	195	41	3,982
	State	3,133	1,385	1,748	1,318	185,001	1,265	472	26,595	3,013	1,790	211,596
	Total -	4,453	2,585	1,868	1,339	188,261	1,340	492	27,317	3,208	1,831	215,578
Totals For California												
TOTAL ALL CONTROL OPERATIONS CALIFORNIA	Federal: National Forest	884,272	590,729	293,543	230,939	49,938,344	204,781	117,622	20,989,405	498,324	348,561	70,927,749
	Federal: National Park	283,912	192,285	91,627	112,785	16,185,092	25,885	27,439	3,567,321	117,512	140,224	19,752,413
	Federal - Total -	1,168,184	783,014	385,170	343,724	66,123,436	230,666	145,061	24,556,726	615,836	488,785	90,680,162
	Private	866,962	527,881	339,081	233,535	53,271,402	179,313	96,449	10,811,543	518,394	329,984	64,082,945
	State	9,773	4,976	4,797	3,102	517,280	2,368	855	45,301	7,165	3,957	562,581
	Total -	2,044,919	1,315,871	729,048	580,361	119,912,118	412,347	242,365	35,413,570	1,141,395	822,726	155,325,688

*All initial work in Lassen Volcanic Park has been completed as per December 31, 1945. The 367 acres shown as unworked are due to minor adjustments in the final control unit boundaries which were made to fit the topography and to the calculation of the actual number of acres within each section worked. The final acreage of the control unit will be 17,565 acres. This table will be adjusted to this figure on the next revision of control unit acreages.

TABLE 1 (Continued)

THE STATUS OF RIBES ERADICATION IN THE PACIFIC COAST REGION AS OF DECEMBER 31, 1945

PART B - OREGON

Control Operation	Class of Ownership	Control Units: Total Acres	Control Units: Acres Unworked	Status of Ribes Eradication: First Working: Acres Worked	First Working: Man Days	First Working: Ribes Eradicated	Reeradication: Acres Worked	Reeradication: Man Days	Reeradication: Ribes Eradicated	Total All Workings: Acres Worked	Total All Workings: Man Days	Total All Workings: Ribes Eradicated
National Forests												
Klamath	Federal: National Forest	9,031	4,896	4,135	5,582	481,239				4,135	5,582	481,239
	Federal: O & C	4,573	3,922	651	1,044	142,179				651	1,044	142,179
	Federal: Total -	13,604	8,818	4,786	6,626	623,418				4,786	6,626	623,418
	Private	1,552	723	829	1,882	113,810				829	1,882	113,810
	Total -	15,156	9,541	5,615	8,508	737,228				5,615	8,508	737,228
Rogue River	Federal: National Forest	87,491	21,586	65,905	39,607	14,624,266	33,385	14,093	1,332,948	99,290	53,700	15,957,214
	Federal: O & C	17,350	10,572	6,778	2,207	274,983				6,778	2,207	274,983
	Federal: Total -	104,841	32,158	72,683	41,814	14,899,249	33,385	14,093	1,332,948	106,068	55,907	16,232,197
	Private	79,010	6,525	72,485	8,156	1,209,598	13,232	2,378	205,311	85,717	10,534	1,414,909
	Total -	183,851	38,683	145,168	49,970	16,108,847	46,617	16,471	1,538,259	191,785	66,441	17,647,106
Siskiyou	Federal: National Forest	67,572	45,204	22,368	8,937	470,367	440	883	27,007	22,808	9,820	497,394
	Federal: O & C	101,480	68,340	33,120	9,183	496,804	1,118	698	11,991	34,238	9,881	508,795
	Federal: Total -	169,032	113,544	55,488	18,120	967,191	1,558	1,581	38,998	57,046	19,701	1,006,189
	Private	77,347	43,016	34,331	5,798	507,317	280	102	629	34,611	5,900	507,946
	State	668	368	300	43	8,328				300	43	8,328
	Total -	247,047	156,928	90,119	23,961	1,482,836	1,838	1,683	39,627	91,957	25,644	1,522,463
Umpqua	Federal: National Forest	60,353	60,353									
	Federal: O & C	6,158	6,158									
	Federal: Total -	66,511	66,511									
	Private	8,266	8,266									
	State	320	320									
	Total -	75,097	75,097									
TOTAL ALL NATIONAL FORESTS	Federal: National Forest	224,447	132,039	92,408	54,126	15,575,892	33,825	14,976	1,359,955	126,233	69,102	16,935,847
	Federal: O & C	129,541	88,992	40,549	12,434	913,966	1,118	698	11,991	41,667	13,132	925,957
	Federal: Total -	353,988	221,031	132,957	66,560	16,489,858	34,943	15,674	1,371,946	167,900	82,234	17,861,804
	Private	166,175	58,530	107,645	15,836	1,830,725	13,512	2,480	205,940	121,157	18,316	2,036,665
	State	988	688	300	43	8,328				300	43	8,328
	Total -	521,151	280,249	240,902	82,439	18,328,911	48,455	18,154	1,577,886	289,357	100,593	19,906,797
National Parks												
Crater Lake	Federal	3,782	150	3,632	412	130,162	350	81	13,430	3,982	493	143,592
Nursery Sanitation												
McDonald State Forest (Clark-McNary Nursery)	Private	418		418	178	2,547				418	178	2,547
	State	462	50	412	174	2,472				412	174	2,472
	Total -	880	50	830	352	5,019				830	352	5,019
O & C (McKinley Nursery)	O & C	168	58	110	162	5,462				110	162	5,462
	Private	132	92	40	111	2,877				40	111	2,877
	Total -	300	150	150	273	8,339				150	273	8,339
TOTAL ALL NURSERIES	O & C	168	58	110	162	5,462				110	162	5,462
	Private	550	92	458	289	5,424				458	289	5,424
	State	462	50	412	174	2,472				412	174	2,472
	Total -	1,180	200	980	625	13,358				980	625	13,358
Mt. Hebo White Pine Plantation												
Siuslaw National Forest	National Forest	680		680	373	124,744	212	228	29,957	892	601	154,701
Totals For Oregon												
TOTAL ALL CONTROL OPERATIONS OREGON	Federal: National Forest	225,127	132,039	93,088	54,499	15,700,636	34,037	15,204	1,389,912	127,125	69,703	17,090,548
	Federal: National Park	3,782	150	3,632	412	130,162	350	81	13,430	3,982	493	143,592
	Federal: O & C	129,709	89,050	40,659	12,596	919,428	1,118	698	11,991	41,777	13,294	931,419
	Federal: Total -	358,618	221,239	137,379	67,507	16,750,226	35,505	15,983	1,415,333	172,884	83,490	18,165,559
	Private	166,725	58,622	108,103	16,125	1,836,149	13,512	2,480	205,940	121,615	18,605	2,042,089
	State	1,450	738	712	217	10,800				712	217	10,800
	Total -	526,793	280,599	246,194	83,849	18,597,175	49,017	18,463	1,621,273	295,211	102,312	20,218,448

PART C - TOTALS FOR THE PACIFIC COAST REGION

CALIFORNIA AND OREGON	Federal: National Forest	1,109,399	722,768	386,631	285,438	65,638,980	238,818	132,826	22,379,317	625,449	418,264	88,018,297
	Federal: National Park	287,694	192,435	95,259	113,197	16,315,254	26,235	27,520	3,580,751	121,494	140,717	19,896,005
	Federal: O & C	129,709	89,050	40,659	12,596	919,428	1,118	698	11,991	41,777	13,294	931,419
	Federal: Total -	1,526,802	1,004,253	522,549	411,231	82,873,662	266,171	161,044	25,972,059	788,720	572,275	108,846,721
	Private	1,033,687	586,503	447,184	249,660	55,107,551	192,825	98,929	11,017,483	640,009	348,589	66,125,034
	State	11,223	5,714	5,509	3,319	528,080	2,368	855	45,301	7,877	4,174	573,381
	Total -	2,571,712	1,596,470	975,242	664,210	138,509,293	461,364	260,828	37,034,843	1,436,606	925,038	175,544,136

TABLE 2

SUMMARY OF RIBES ERADICATION IN THE PACIFIC COAST REGION - 1945

Operation	Class of Work	Acres Worked	8-Hour Man Days	Ribes Eradicated
California				
Klamath National Forest	Initial	2,102	2,701	143,958
	Reeradication	1,373	917	11,862
	Totals	3,475	3,618	155,820
Lassen National Forest	Initial	3,246	2,751	605,277
	Reeradication	2,812	1,625	147,335
	Totals	6,058	4,376	752,612
Plumas National Forest	Initial	3,202	7,534	1,310,833
	Reeradication	3,618	1,907	233,875
	Totals	6,820	9,441	1,544,708
Eldorado National Forest	Initial	2,570	2,174	292,306
	Reeradication	9,248	4,127	598,945
	Totals	11,818	6,301	891,251
Stanislaus National Forest	Reeradication	5,652	4,850	597,345
Sierra National Forest	Reeradication	2,297	2,824	526,474
NATIONAL FOREST TOTALS	Initial	11,120	15,160	2,352,374
	Reeradication	25,000	16,250	2,115,836
	Totals	36,120	31,410	4,468,210
Lassen Volcanic National Park	Initial	3,675	464	56,335
	Reeradication	1,080	487	25,225
	Totals	4,755	951	81,560
Yosemite National Park	Initial	400	1,040	155,172
	Reeradication	5,131	5,205	343,884
	Totals	5,531	6,245	499,056
Kings Canyon National Park	Initial	1,193	1,365	158,692
	Reeradication	1,569	694	57,824
	Totals	2,762	2,059	216,516
Sequoia National Park	Initial	845	1,277	142,975
	Reeradication	963	254	8,202
	Totals	1,808	1,531	151,177
NATIONAL PARK TOTALS	Initial	6,113	4,146	513,174
	Reeradication	8,743	6,640	435,135
	Totals	14,856	10,786	948,309
CALIFORNIA TOTALS	Initial	17,233	19,306	2,865,548
	Reeradication	33,743	22,890	2,550,971
	Totals	50,976	42,196	5,416,519
Oregon				
Rogue River National Forest	Reeradication	4,088	2,412	136,060
Siskiyou National Forest	Initial	4,723	3,367	163,663
	Reeradication	1,712	1,630	35,578
	Totals	6,435	4,997	199,241
Klamath National Forest	Initial	1,047	2,019	203,699
OREGON TOTALS	Initial	5,770	5,386	367,362
	Reeradication	5,800	4,042	171,638
	Totals	11,570	9,428	539,000
Pacific Coast Region				
CALIFORNIA AND OREGON	Initial	23,003	24,692	3,232,910
	Reeradication	39,543	26,932	2,722,609
	Totals	62,546	51,624	5,955,519

TABLE 3

SUMMARY OF RIBES ERADICATION BY AGENCY AND BY LAND OWNERSHIP IN THE PACIFIC COAST REGION - 1945

Work Agency	Acres Worked	Acres Blocked Out	Acres Total	8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status: Acres Covered: Federal: National Forest	Acres Covered: Federal: National Park	Acres Covered: Federal: O & C	Acres Covered: Total	Acres Covered: Private	8-Hour Man Days: Federal: National Forest	8-Hour Man Days: Federal: National Park	8-Hour Man Days: Federal: O & C	8-Hour Man Days: Total	8-Hour Man Days: Private	Ribes Eradicated: Federal: National Forest	Ribes Eradicated: Federal: National Park	Ribes Eradicated: Federal: O & C	Ribes Eradicated: Total	Ribes Eradicated: Private	Acres Ribes-Free At Re-eradication
Initial Work																							
California:																							
B.E.P.Q.	7,011	161	7,172	8,139	1,408,552	1.16	201	2,192			2,192	4,980	2,163			2,163	5,976	444,371			444,371	964,181	
Forest Service	3,864	84	3,948	7,021	943,822	1.82	244	1,571			1,571	2,377	2,262			2,262	4,759	323,665			323,665	620,157	
Park Service	3,326	2,787	6,113	4,146	513,174	1.25	154		6,113		6,113			4,146		4,146			513,174		513,174		
Subtotals - - -	14,201	3,032	17,233	19,306	2,865,548	1.36	202	3,763	6,113		9,876	7,357	4,425	4,146		8,571	10,735	768,036	513,174		1,281,210	1,584,338	
Oregon:																							
Forest Service	3,029	1,496	4,525	3,912	289,946	1.29	96	2,722		1,563	4,285	240	2,347		1,482	3,829	83	133,333		153,875	287,208	2,738	
O & C Admin.	636	609	1,245	1,474	77,416	2.32	122	925		320	1,245		854		620	1,474		45,190		32,226	77,416		
Subtotals - - -	3,665	2,105	5,770	5,386	367,362	1.47	100	3,647		1,883	5,530	240	3,201		2,102	5,303	83	178,523		186,101	364,624	2,738	
Totals - - -	17,866	5,137	23,003	24,692	3,232,910	1.38	181	7,410	6,113	1,883	15,406	7,597	7,626	4,146	2,102	13,874	10,818	946,559	513,174	186,101	1,645,834	1,587,076	
Reeradication Work																							
California:																							
B.E.P.Q.	10,574		10,574	6,429	710,503	0.61	67	2,222			2,222	8,352	1,355			1,355	5,074	193,461			193,461	517,042	3,846
Forest Service	14,426		14,426	9,821	1,405,333	0.68	97	7,641			7,641	6,785	6,006			6,006	3,815	923,096			923,096	482,237	3,836
Park Service	8,743		8,743	6,640	435,135	0.76	50		8,743		8,743			6,640		6,640			435,135		435,135		4,374
Subtotals - - -	33,743		33,743	22,890	2,550,971	0.68	76	9,863	8,743		18,606	15,137	7,361	6,640		14,001	8,889	1,116,557	435,135		1,551,692	999,279	12,656
Oregon:																							
Forest Service	4,088		4,088	2,412	136,060	0.59	33	4,088			4,088		2,412			2,412		136,060			136,060		344
O & C Admin.	1,712		1,712	1,630	35,578	0.95	21	404		1,028	1,432	280	852		676	1,528	102	24,193		10,756	34,949	629	1,194
Subtotals - - -	5,800		5,800	4,042	171,638	0.70	30	4,492		1,028	5,520	280	3,264		676	3,940	102	160,253		10,756	171,009	629	1,538
Totals - - -	39,543		39,543	26,932	2,722,609	0.68	69	14,355	8,743	1,028	24,126	15,417	10,625	6,640	676	17,941	8,991	1,276,810	435,135	10,756	1,722,701	999,908	14,194
All Workings																							
California:																							
B.E.P.Q.	17,585	161	17,746	14,568	2,119,055	0.83	121	4,414			4,414	13,332	3,518			3,518	11,050	637,832			637,832	1,481,223	3,846
Forest Service	18,290	84	18,374	16,842	2,349,155	0.92	128	9,212			9,212	9,162	8,268			8,268	3,574	1,246,761			1,246,761	1,102,394	3,836
Park Service	12,069	2,787	14,856	10,786	948,309	0.89	79		14,856		14,856			10,786		10,786			948,309		948,309		4,374
Subtotals - - -	47,944	3,032	50,976	42,196	5,416,519	0.88	113	13,626	14,856		28,482	22,494	11,786	10,786		22,572	19,624	1,884,593	948,309		2,832,902	2,583,617	12,656
Oregon:																							
Forest Service	7,117	1,496	8,613	6,324	426,006	0.89	60	6,810		1,563	8,373	240	4,759		1,482	6,241	83	269,393		153,875	423,268	2,738	344
O & C Admin.	2,348	609	2,957	3,104	112,994	1.32	48	1,329		1,348	2,677	280	1,706		1,296	3,002	102	69,383		42,982	112,365	629	1,194
Subtotals - - -	9,465	2,105	11,570	9,428	539,000	1.00	57	8,139		2,911	11,050	520	6,465		2,778	9,243	185	338,776		196,857	535,633	3,367	1,538
Totals - - -	57,409	5,137	62,546	51,624	5,955,519	0.90	104	21,765	14,856	2,911	39,532	23,014	18,251	10,786	2,778	31,815	19,809	2,223,369	948,309	196,857	3,368,535	2,586,984	14,194

TABLE 4

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE PACIFIC COAST REGION IN 1945

Land Ownership	Status Of Ribes Eradication																	
	First Working			Second Working			Third Working			Fourth Working			Fifth Working			Total All Workings		
	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated
California																		
National Forest	3,763	4,425	768,036	3,070	2,408	441,547	6,238	4,346	567,573	375	296	12,058	180	311	95,379	13,626	11,786	1,884,593
National Park	6,113	4,146	513,174	7,434	4,520	275,404	1,309	2,120	159,731							14,856	10,786	948,309
Subtotals - Federal	9,876	8,571	1,281,210	10,504	6,928	716,951	7,547	6,466	727,304	375	296	12,058	180	311	95,379	28,482	22,572	2,832,902
Private	7,357	10,735	1,584,338	4,718	3,136	286,314	8,759	4,418	646,818	1,660	1,335	66,147				22,494	19,624	2,583,617
Totals - - - - - -	17,233	19,306	2,865,548	15,222	10,064	1,003,265	16,306	10,884	1,374,122	2,035	1,631	78,205	180	311	95,379	50,976	42,196	5,416,519
Oregon																		
National Forest	3,847	3,201	178,523	4,492	3,264	160,253										8,139	6,465	338,776
O & C Rev. Lands Admin.	1,883	2,102	186,101	1,028	676	10,756										2,911	2,778	196,857
Subtotals - Federal	5,530	5,303	364,624	5,520	3,940	171,009										11,050	9,243	535,633
Private	240	83	2,738	280	102	629										520	185	3,367
Totals - - - - - -	5,770	5,386	367,362	5,800	4,042	171,638										11,570	9,428	539,000
Pacific Coast Region																		
National Forest	7,410	7,626	946,559	7,562	5,672	601,800	6,238	4,346	567,573	375	296	12,058	180	311	95,379	21,765	18,251	2,223,369
National Park	6,113	4,146	513,174	7,434	4,520	275,404	1,309	2,120	159,731							14,856	10,786	948,309
O & C Rev. Lands Admin.	1,883	2,102	186,101	1,028	676	10,756										2,911	2,778	196,857
Subtotals - Federal	15,406	13,874	1,645,834	16,024	10,868	887,960	7,547	6,466	727,304	375	296	12,058	180	311	95,379	39,532	31,815	3,368,535
Private	7,597	10,818	1,587,076	4,998	3,238	286,943	8,759	4,418	646,818	1,660	1,335	66,147				23,014	19,809	2,586,984
Grand Totals - - -	23,003	24,692	3,232,910	21,022	14,106	1,174,903	16,306	10,884	1,374,122	2,035	1,631	78,205	180	311	95,379	62,546	51,624	5,955,519

TABLE 5

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE PACIFIC COAST REGION 1925-1945

Land Ownership	Status Of Ribes Eradication																	
	First Working			Second Working			Third Working			Fourth Working			Fifth Working			Total All Workings		
	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated	Acres Worked	8-Hour Man Days	Ribes Eradicated
California																		
National Forest	293,543	230,939	49,938,344	151,861	85,579	15,136,282	42,940	27,605	5,472,223	6,572	3,252	228,946	3,408	1,186	151,974	498,324	348,561	70,927,749
National Park	91,627	112,785	16,185,092	24,576	25,319	3,407,590	1,309	2,120	159,731							117,512	140,224	19,752,413
Subtotals - Federal	385,170	343,724	66,123,436	176,437	110,898	18,543,872	44,249	29,725	5,631,954	6,572	3,252	228,946	3,408	1,186	151,974	615,836	488,785	90,680,162
Private	339,081	233,535	53,271,402	145,689	81,230	8,550,069	30,337	13,318	2,131,665	2,997	1,846	127,202	290	55	2,607	518,394	329,984	64,082,945
State	4,797	3,102	517,280	2,213	814	44,114	155	41	1,187							7,165	3,957	562,581
Totals - - - - - -	729,048	580,361	119,912,118	324,339	192,942	27,138,035	74,741	43,084	7,764,806	9,569	5,098	356,148	3,698	1,241	154,581	1,141,395	822,726	155,325,688
Oregon																		
National Forest	93,088	54,499	15,700,636	28,731	11,480	1,192,671	4,730	3,429	194,600	576	295	2,641				127,125	69,703	17,090,548
National Park	3,632	412	130,162	350	81	13,430										3,982	493	143,592
O & C Rev. Lands Admin.	40,659	12,596	919,428	1,118	698	11,991										41,777	13,294	931,419
Subtotals - Federal	137,379	67,507	16,750,226	30,199	12,259	1,218,092	4,730	3,429	194,600	576	295	2,641				172,884	83,490	18,165,559
Private	108,103	16,125	1,836,149	12,857	2,154	187,128	642	318	18,746	13	8	66				121,615	18,605	2,042,089
State	712	217	10,800													712	217	10,800
Totals - - - - - -	246,194	83,849	18,597,175	43,056	14,413	1,405,220	5,372	3,747	213,346	589	303	2,707				295,211	102,312	20,218,448
Pacific Coast Region																		
National Forest	386,631	285,438	65,638,980	180,592	97,059	16,328,933	47,670	31,034	5,666,823	7,148	3,547	231,587	3,408	1,186	151,974	625,449	418,264	88,018,297
National Park	95,259	113,197	16,315,254	24,926	25,400	3,421,020	1,309	2,120	159,731							121,494	140,717	19,896,005
O & C Rev. Lands Admin.	40,659	12,596	919,428	1,118	698	11,991										41,777	13,294	931,419
Subtotals - Federal	522,549	411,231	82,873,662	206,636	123,157	19,761,944	48,979	33,154	5,826,554	7,148	3,547	231,587	3,408	1,186	151,974	788,720	572,275	108,845,721
Private	447,184	249,660	55,107,551	158,546	83,384	8,737,197	30,979	13,636	2,150,411	3,010	1,854	127,268	290	55	2,607	640,009	348,589	66,125,034
State	5,509	3,319	528,080	2,213	814	44,114	155	41	1,187							7,877	4,174	573,381
Grand Totals - - -	975,242	664,210	138,509,293	367,395	207,355	28,543,255	80,113	46,831	7,978,152	10,158	5,401	358,855	3,698	1,241	154,581	1,436,606	925,038	175,544,136

TABLE 6

THE DISTRIBUTION OF CAMPS IN THE PACIFIC COAST REGION DURING 1945

Control Operation	Agency and Fund	County	Number and Average Size of Camps	Approximate Period of Operation	Location
			Oregon		
Siskiyou	FS - Reg.	Josephine	1 - 20 1 - 50	June 6 - Sept.15	Oregon Caves - Bolan Creek
	O&C - Reg.	Josephine	2 - 50	June 4 - Sept.15	Swede Basin - Spaulding Mill
Rogue River	FS - Reg.	Jackson	1 - 100	June 11 - Aug. 30	Union Creek
			California		
Klamath	FS - Reg.	Siskiyou	3 - 50	May 10 - Oct. 23	Cinnabar Springs Hungry Creek - Beaver Creek
Lassen Volcanic	NPS - Reg.	Shasta	1 - 40	July 2 - Aug. 26	Lost Creek
Lassen	EQ - Reg.	Tehama	2 - 45	June 19 - Aug. 30	Mill Creek - Soda Springs
	EQ - Reg.	Butte	1 - 40	June 27 - Aug. 30	Rag Dump
Plumas	FS - Reg.	Sierra	1 - 60	June 18 - Aug. 31	Scales
	FS - Reg.	Plumas	1 - 25 2 - 50	June 11 - Oct. 15	Coldwater Canyon Dam- Mooreville Ridge
	EQ - Reg.	Plumas	1 - 40 2 - 45	June 22 - Aug. 30	Walter's Mine American House- Camel Peak
Eldorado	FS - Reg.	Eldorado	1 - 40	June 18 - Sept. 1	China Flat
	EQ - Reg.	Eldorado	3 - 50	June 20 - Sept.12	Cold Spring Hunter's Valley- Pi Pi
Stanislaus	FS - Reg.	Tuolumne	2 - 50	June 18 - Aug. 31	Carl Inn- Jawbone
	EQ - Reg.	Tuolumne	1 - 50	June 18 - Aug. 31	Fisher Creek
	EQ - Reg.	Calaveras	1 - 40	July 5 - Sept.30	Calaveras Big Trees
Sierra	FS - Reg.	Mariposa	1 - 50	June 16 - Aug. 24	Summit Camp
	FS - Reg.	Madera	1 - 50	June 18 - Sept. 8	Soquel
Yosemite	NPS - Reg.	Tuolumne	1 - 100	June 14 - Aug. 24	Crane Flat
	NPS - Reg.	Mariposa	1 - 50	May 18 - Aug. 31	Wawona
Kings Canyon	NPS - Reg.	Fresno	1 - 20	May 22 - Sept.27	Cedar Springs
Sequoia	NPS - Reg.	Tulare	1 - 40	June 20 - Aug. 25	Red Fir

TABLE 7

SUMMARY OF CHECKING IN THE PACIFIC COAST REGION - 1945

Operation	Regular Check			Advance Check			Post Check		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Oregon									
Rogue River	3,675	4.6	70.5	-	-	-	15,539	4.0	140.5
Siskiyou	4,979	5.0	106	4,026	4.2	83	4,337	4.7	76.5
Totals	8,654	4.9	176.5	4,026	4.2	83	19,876	4.1	217
California									
Klamath	7,170	3.9	139	2,019	2.5	35	-	-	-
Plumas-Lassen	5,530	5.0	101.5	5,490	2.9	61	18,478	3.8	250.5
Eldorado	4,323	4.5	80	3,841	3.7	44	6,376	2.7	62
Stanislaus	3,520	3.5	42.5	630	2.2	5	17,438	3.2	181.5
Sierra N. P.	9,563	5.0	240	-	-	-	6,152	2.9	98
Totals	30,106	4.5	603	11,980	3.1	145	48,444	3.4	592
Pacific Coast Region									
Totals	38,760	4.6	779.5	16,006	3.3	228	68,320	3.6	809

TABLE 8

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE PACIFIC COAST REGION - 1945

State	Class Of Check	Man Days	Per Cent Of Total Man Days	Strip Acres	Strip Acres Per Man Day	Strip Acres Per Field Man Day	Total Cost	Cost Per Acre Basis Acres Covered By Check	Cost Per Strip Acre
Oregon	Regular	176.5	33.6	422.3	2.4	3.0	$ 1,716.70	$0.178	$4.07
	Advance	83	15.8	168.7	2.0	2.5	807.29	0.201	4.79
	Post	217	41.2	818.4	3.8	4.7	2,110.62	0.106	2.58
	All	476.5	90.6	1,409.4	3.0	3.7	4,634.61	0.142	3.29
California	Regular	603	31.5	1,352.3	2.2	3.2	5,999.70	0.199	4.44
	Advance	145	7.6	366.2	2.5	3.3	1,512.53	0.126	4.13
	Post	592	30.9	1,622.6	2.7	3.5	5,934.69	0.123	3.66
	All	1,340	70.0	3,341.1	2.5	3.3	13,446.92	0.149	4.02
Totals Pacific Coast Region	Regular	779.5	32.0	1,774.6	2.3	3.1	7,716.40	0.199	4.35
	Advance	228	9.3	534.9	2.3	3.0	2,319.82	0.145	4.34
	Post	809	33.2	2,441.0	3.0	3.8	8,045.31	0.118	3.30
	All	1,816.5	74.5	4,750.5	2.6	3.4	$18,081.53	$0.147	$3.81

TABLE 9

ANALYSIS OF CHECKING TIME DEVOTED TO OTHER ACTIVITIES IN THE PACIFIC COAST REGION - 1945

State	Eradication		Pine Count		Section Line Control		Scouting		Total		Per Cent Of Total Man Days*	Fire*	
	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost		Man Days	Total Cost
Oregon	-	-	10	$ 97.26	37.5	$ 364.74	2	$ 19.46	49.5	$ 481.46	9.4	72	$ 780.95
California	345.5	$3,414.34	25	239.83	181	1,827.78	21.5	222.77	573	5,704.72	30.0	169.5	1,584.97
Totals	345.5	$3,414.34	35	$337.09	218.5	$2,192.52	23.5	$242.23	622.5	$6,186.18	25.5	241.5	$2,365.92

*Costs for fires were reimbursed. Therefore man days not included in figuring percentages.

MAPS OF ACTIVE CONTROL OPERATIONS SHOWING

THE STATUS OF BLISTER RUST CONTROL

AS OF DECEMBER 31, 1945

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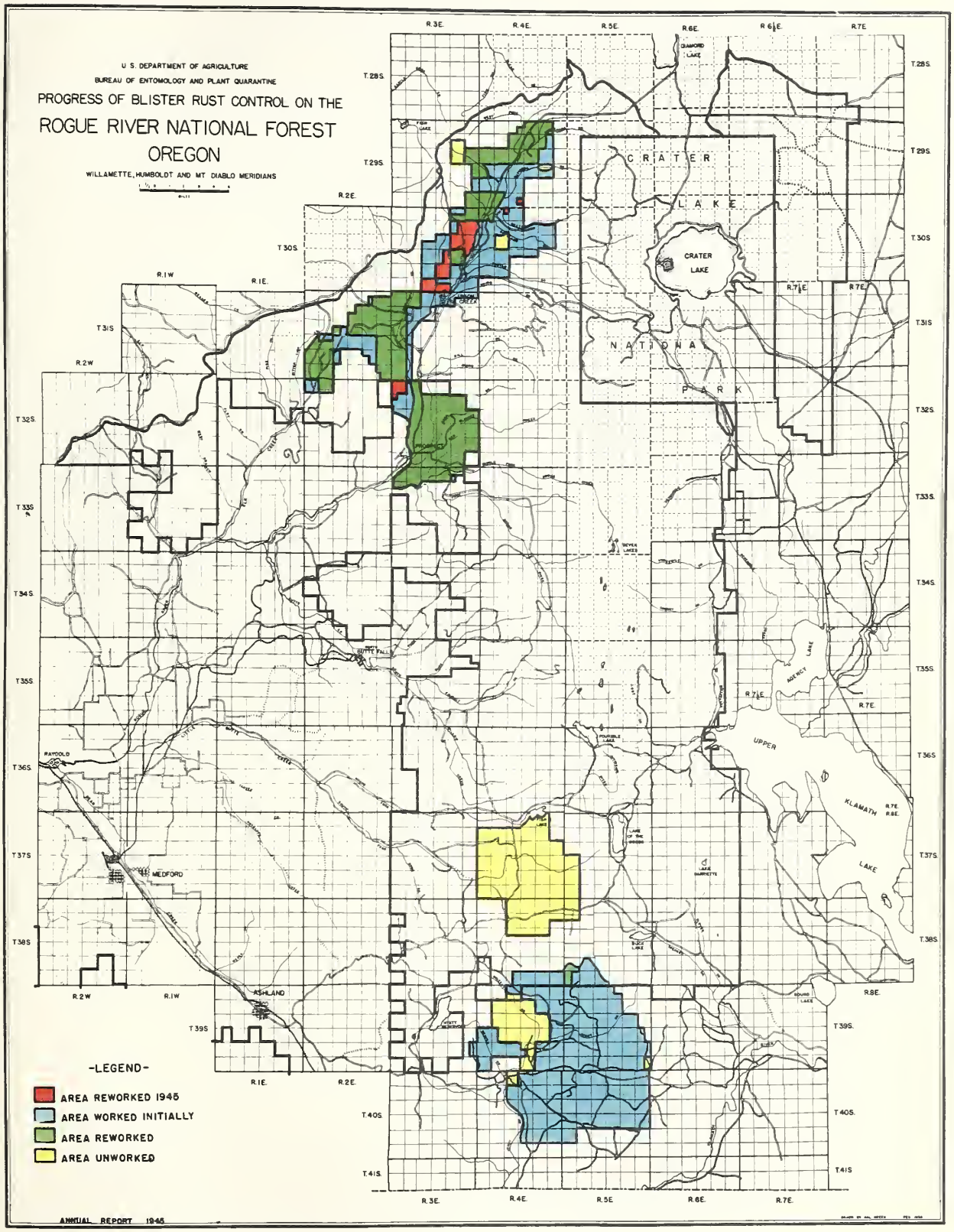

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
ROGUE RIVER NATIONAL FOREST
OREGON
WILLAMETTE, HUMBOLDT AND MT DIABLO MERIDIANS
CRATER LAKE
CRATER LAKE NATIONAL PARK
UPPER KLAMATH LAKE
MEDFORD
ASHLAND
-LEGEND-
AREA REWORKED 1945
AREA WORKED INITIALLY
AREA REWORKED
AREA UNWORKED
ANNUAL REPORT 1945

U S DEPARTMENT OF AGRICULTURE

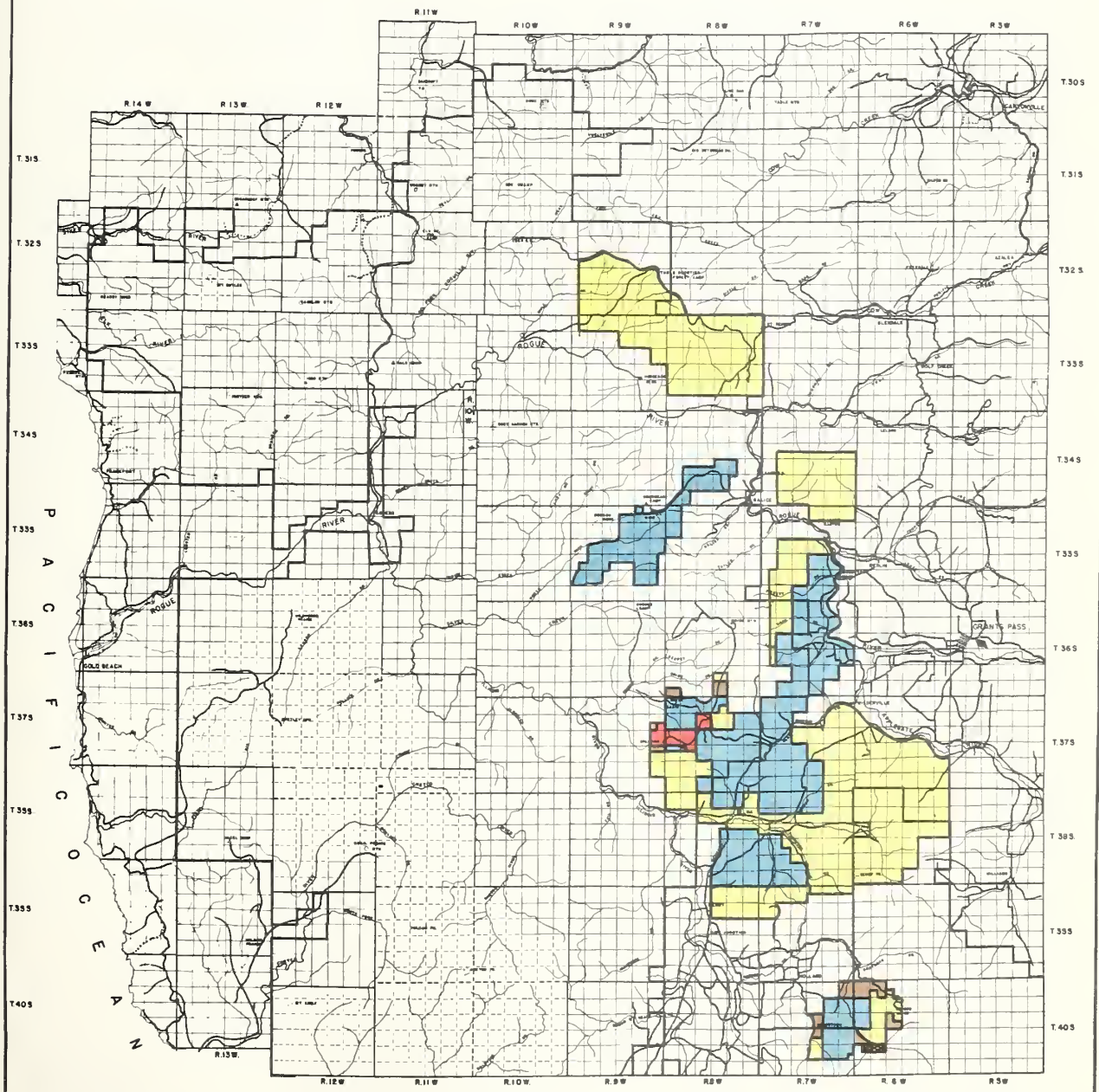
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

PROGRESS OF BLISTER RUST CONTROL ON THE SISKIYOU NATIONAL FOREST OREGON

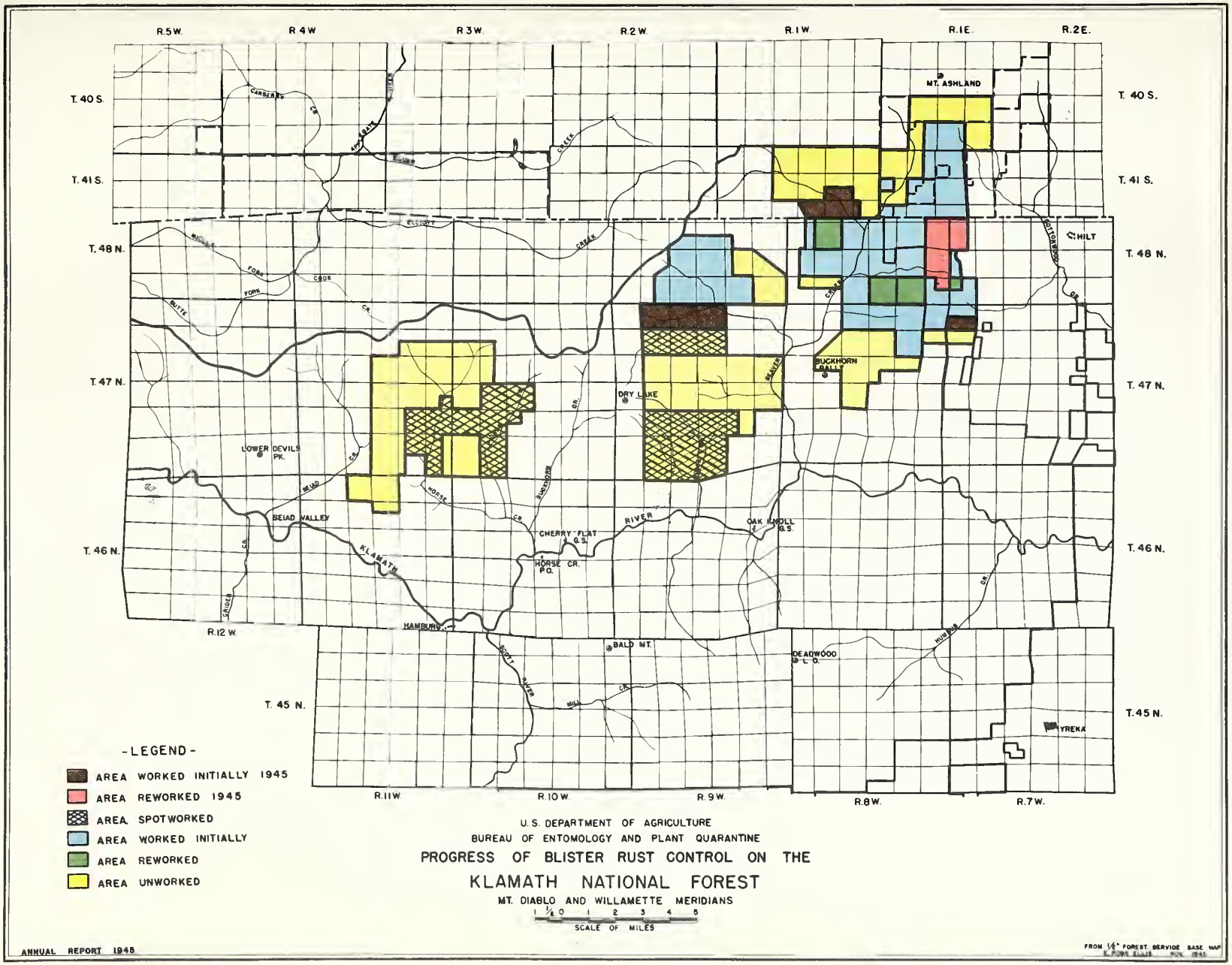
WILLAMETTE AND HUMBOLDT MERIDIANS

- LEGEND -

- AREA WORKED INITIALLY 1945
- AREA REWORKED 1945
- AREA WORKED INITIALLY
- AREA UNWORKED
- AREA SPOTWORKED



ANNUAL REPORT 1945



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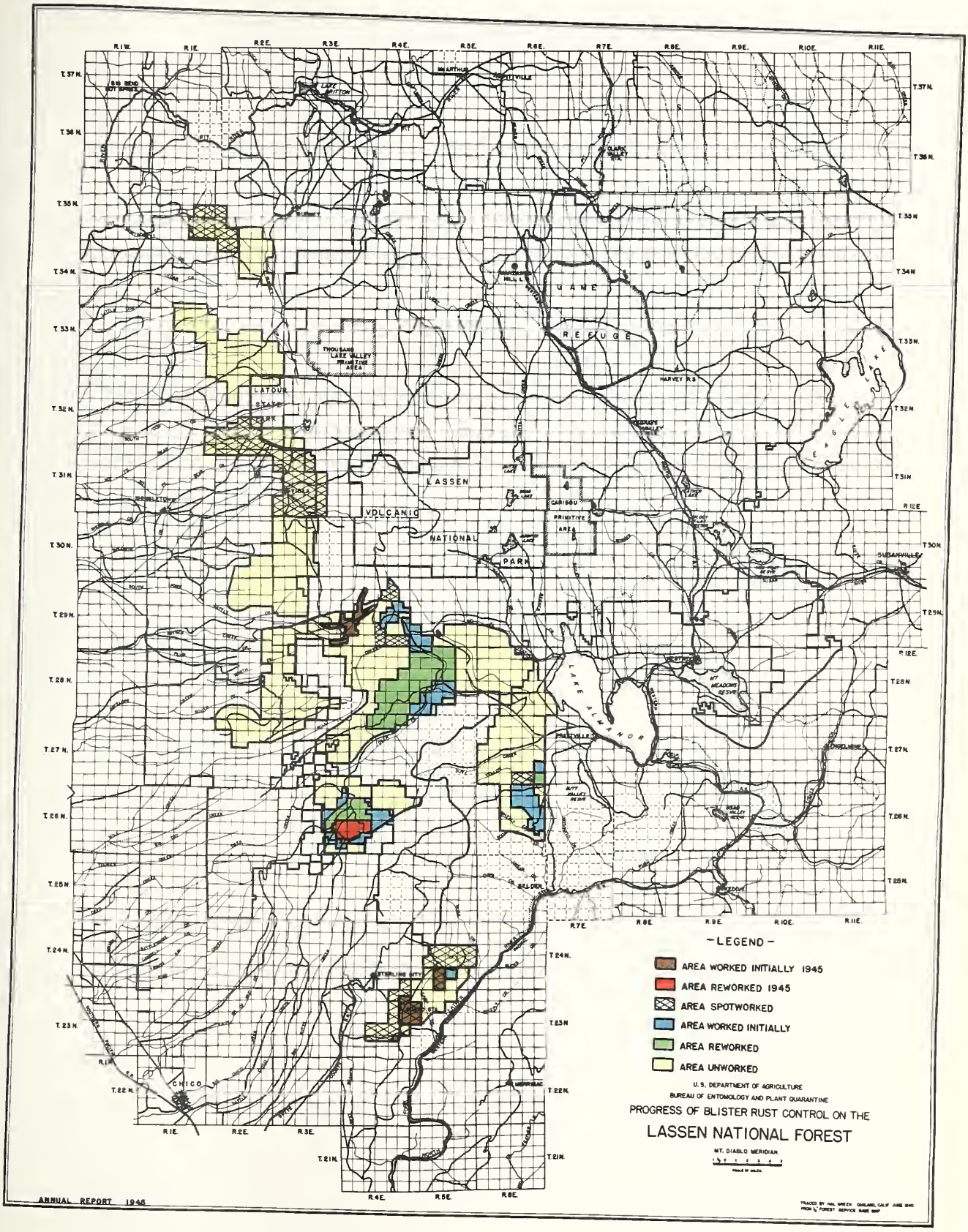
PROGRESS OF BLISTER RUST CONTROL ON THE

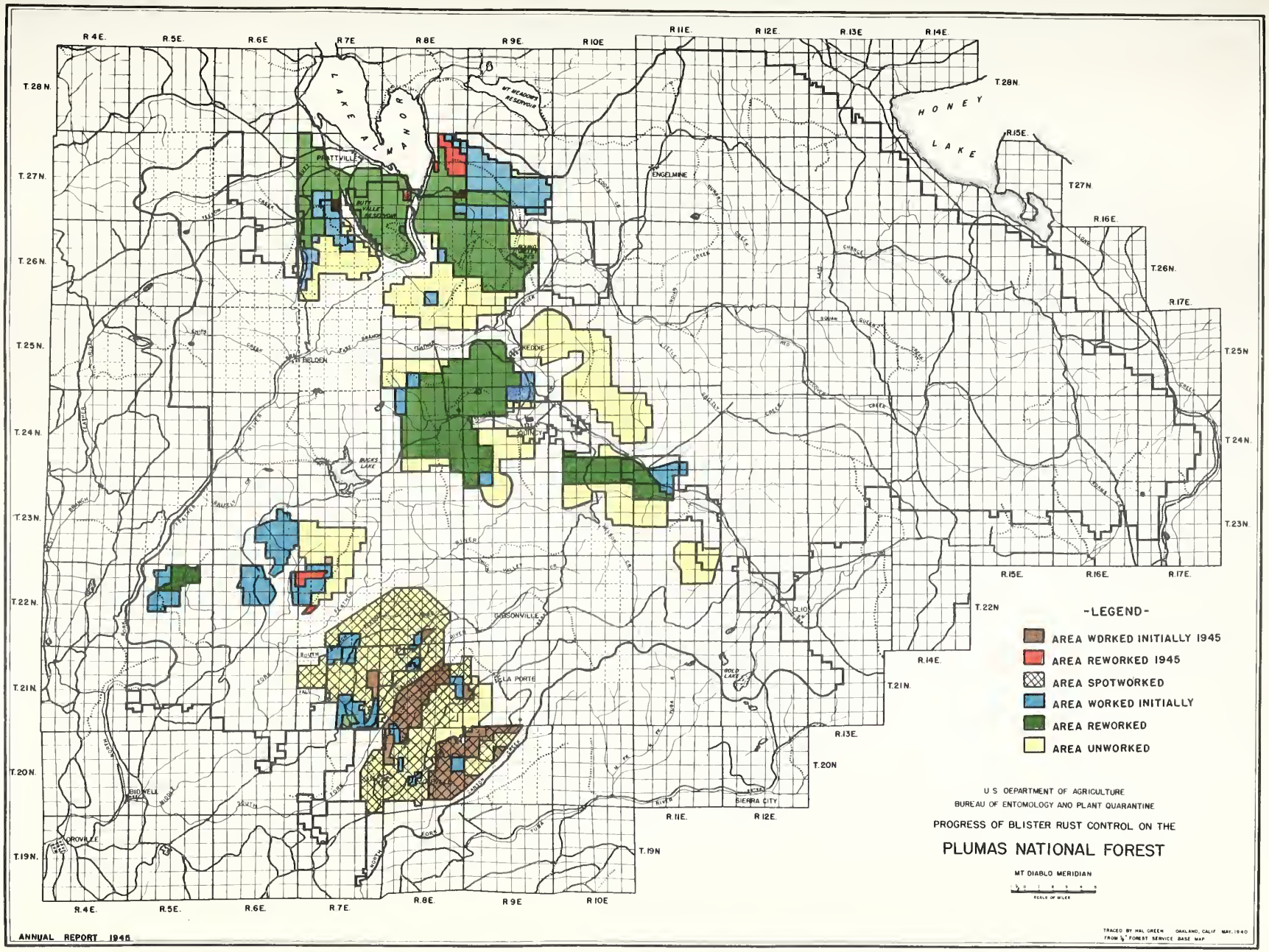
KLAMATH NATIONAL FOREST

MT. DIABLO AND WILLAMETTE MERIDIANS

ANNUAL REPORT 1948

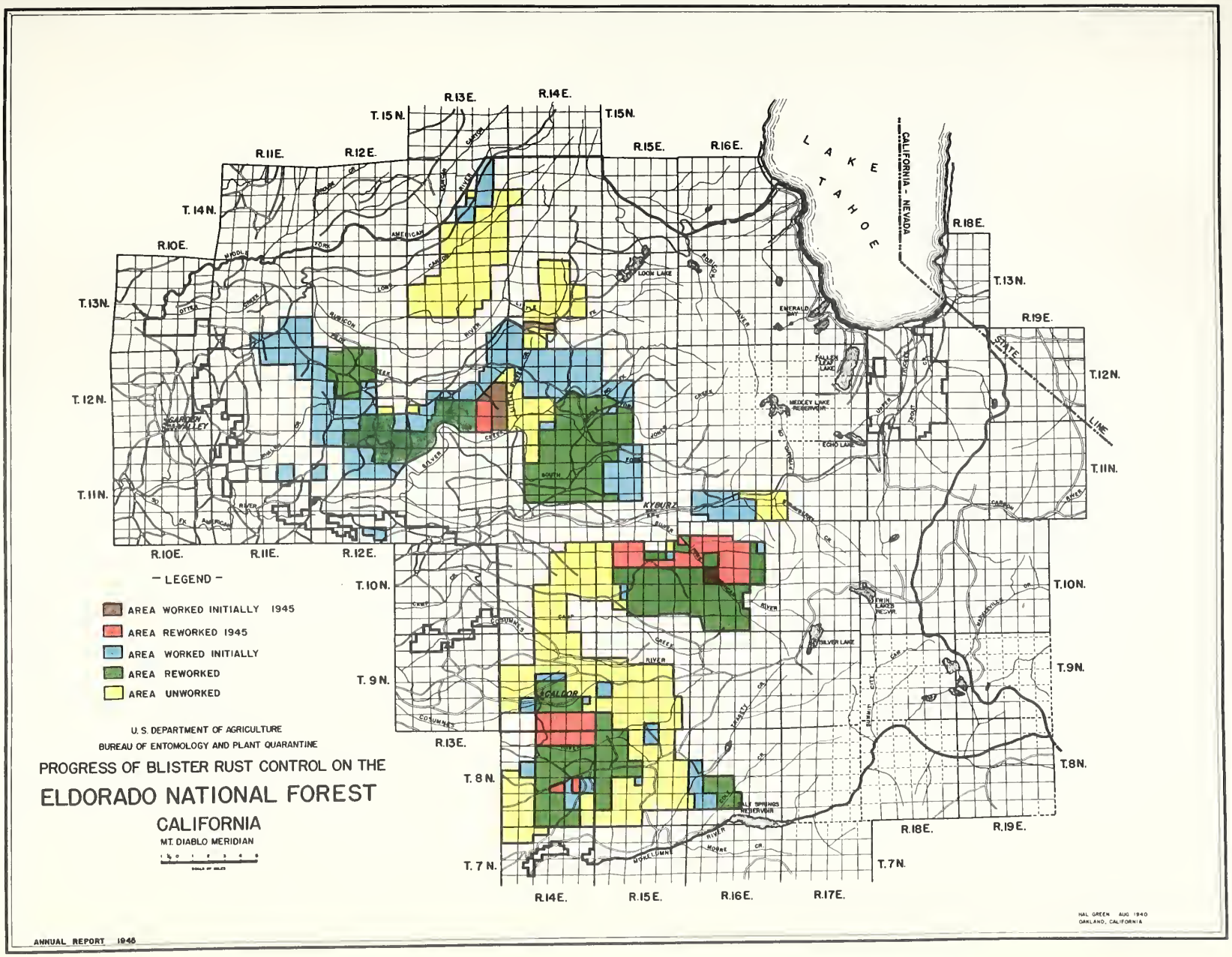
FROM 1/4" FOREST SERVICE BASE MAP

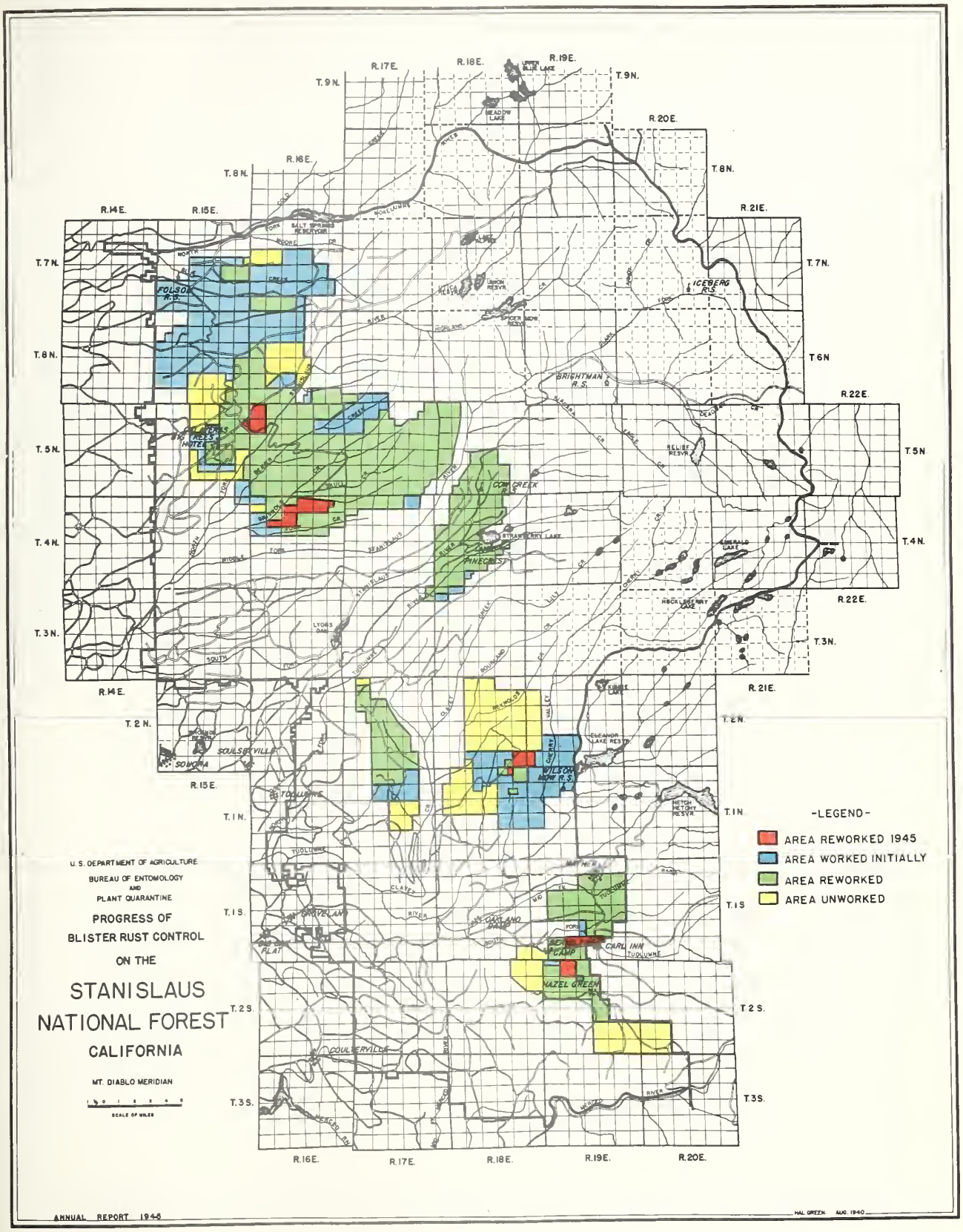

LEGEND
AREA WORKED INITIALLY 1945
AREA REWORKED 1945
AREA SPOTWORKED
AREA WORKED INITIALLY
AREA REWORKED
AREA UNWORKED
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
LASSEN NATIONAL FOREST
MT. DIABLO MERIDIAN.
GAME
REFUGE
LASSEN
VOLCANIC
NATIONAL
PARK
LATOUR
STATE
PARK
THOUSAND LAKE VALLEY PRIMITIVE AREA
CARIBOU
PRIMITIVE
AREA
LAKE ALMANOR
EAGLE LAKE
CHICO
ANNUAL REPORT 1945



ANNUAL REPORT 1946

TRACED BY HAL GREEN OAKLAND, CALIF MAY, 1940
FROM 1/4" FOREST SERVICE BASE MAP


PROGRESS OF BLISTER RUST CONTROL ON THE
ELDORADO NATIONAL FOREST
CALIFORNIA
MT. DIABLO MERIDIAN
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
— LEGEND —
AREA WORKED INITIALLY 1945
AREA REWORKED 1945
AREA WORKED INITIALLY
AREA REWORKED
AREA UNWORKED
LAKE TAHOE
CALIFORNIA - NEVADA STATE LINE
T. 15 N.
T. 14 N.
T. 13 N.
T. 12 N.
T. 11 N.
T. 10 N.
T. 9 N.
T. 8 N.
T. 7 N.
R. 10 E.
R. 11 E.
R. 12 E.
R. 13 E.
R. 14 E.
R. 15 E.
R. 16 E.
R. 17 E.
R. 18 E.
R. 19 E.
LOON LAKE
EMERALD BAY
FALLEN LEAF LAKE
MEEKS LAKE RESERVOIR
ECHO LAKE
KYBURZ
SILVER LAKE
TWIN LAKES RESERVOIR
COLOMA
SALLY SPRINGS RESERVOIR
GARDEN VALLEY
HAL GREEN AUG 1940
OAKLAND, CALIFORNIA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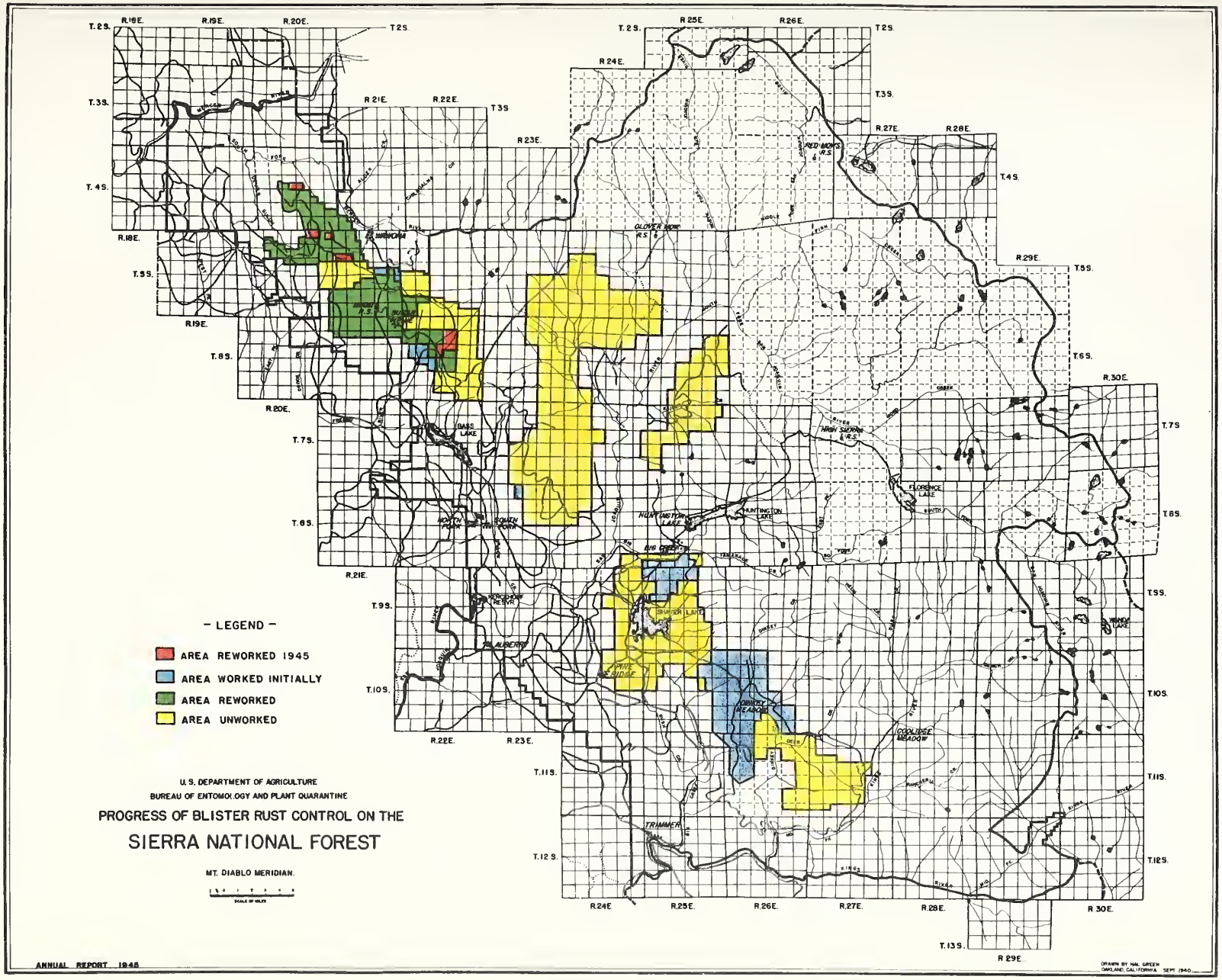
PLANT QUARANTINE
PROGRESS OF
BLISTER RUST CONTROL
ON THE
STANISLAUS
NATIONAL FOREST
CALIFORNIA
MT. DIABLO MERIDIAN
SCALE OF MILES
-LEGEND-
AREA REWORKED 1945
AREA WORKED INITIALLY
AREA REWORKED
AREA UNWORKED
R.14E.
R.15E.
R.16E.
R.17E.
R.18E.
R.19E.
R.20E.
R.21E.
R.22E.
T.9N.
T.8N.
T.7N.
T.6N
T.5N.
T.4N.
T.3N.
T.2N.
T.1N.
T.1S.
T.2S.
T.3S.
FOLSOM R.S.
ICEBERG R.S.
BRIGHTMAN R.S.
COW CREEK
PINECREST
STRAWBERRY LAKE
EMERALD LAKE
BLUE LAKE
UPPER BLUE LAKE
MEADOW LAKE
SALT SPRINGS RESERVOIR
UNION RESVR.
SPICER MEM. RESVR.
BELLIE RESVR.
HUCKLEBERRY LAKE
LYONS DAM
SONORA
SOULSBYVILLE
TUOLUMNE
WILSON MEM. R.S.
ELEANOR LAKE RESVR.
HETCH HETCHY RESVR.
MATHER
CURL INN
HAZEL GREEN
COULTERVILLE
GARVELAND
OAKLAND
ANNUAL REPORT 1945
HAL GREEN AUG. 1940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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
SIERRA NATIONAL FOREST
MT. DIABLO MERIDIAN.
SCALE OF MILES
ANNUAL REPORT 1945
DRAWN BY HAL GREEN
OAKLAND, CALIFORNIA SEPT 1940
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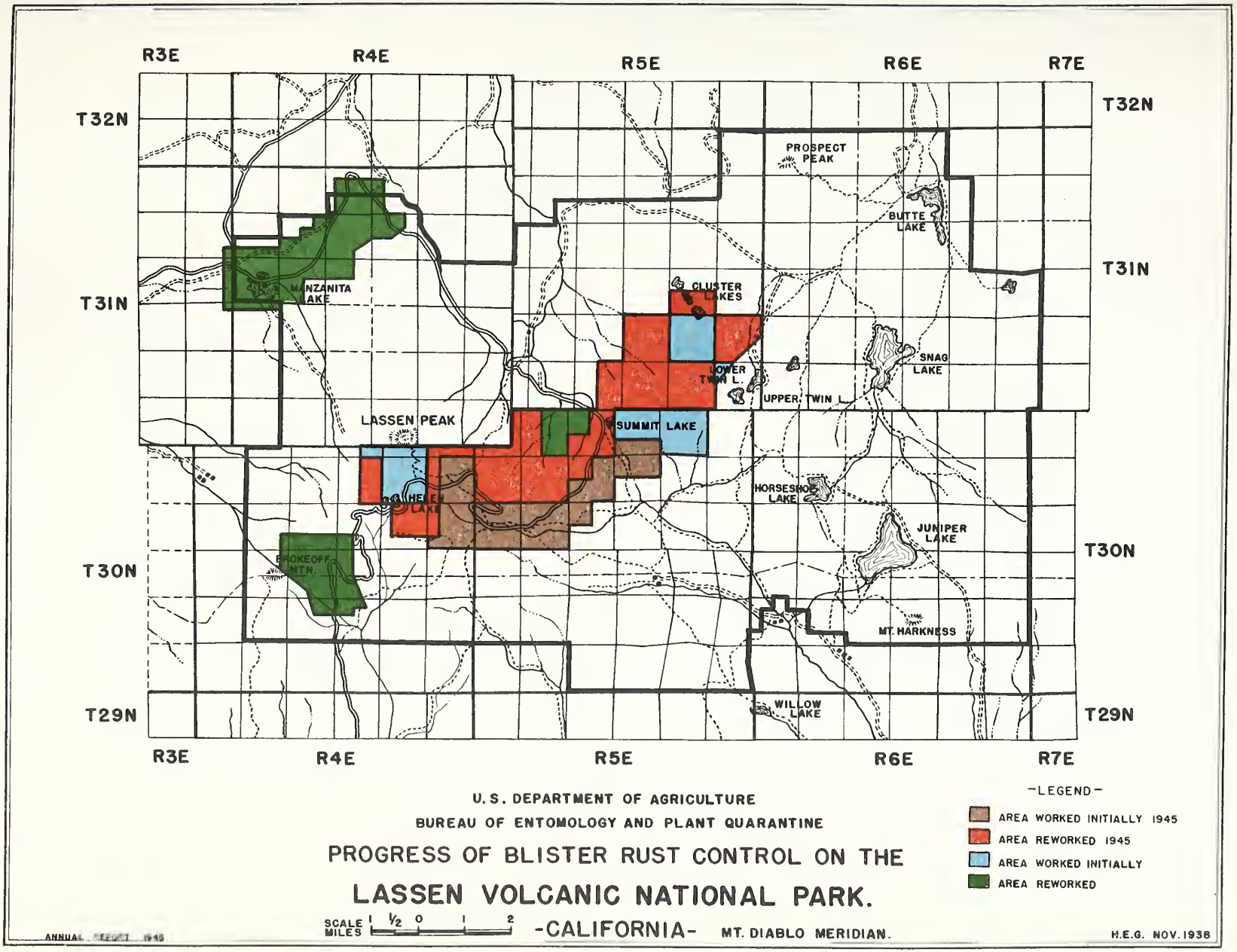
WINCHELL
FOR
RIVER
WINCHELL
BASS LAKE
NORTH FORK
SOUTH FORK
HUNTINGTON LAKE
HUNTINGTON LAKE
BIG CREEK
BIG CREEK
HORSESHOE RESVR.
ALBERTA
GRANITE RIDGE
COOLIDGE MEADOW
COOLIDGE MEADOW
COOLIDGE MEADOW
TRIMMER
FLORENCE LAKE
HIGH SIERRA R.S.
OLIVER HOW R.S.
RED MOUNTAIN R.S.
WAHO LAKE
KINGS
RIVER


R3E
R4E
R5E
R6E
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T31N
T30N
T29N
PROSPECT PEAK
BUTTE LAKE
MANZANITA LAKE
CLUSTER LAKES
SNAG LAKE
LOWER TWIN L.
UPPER TWIN L.
LASSEN PEAK
SUMMIT LAKE
HELEN LAKE
HORSESHOE LAKE
JUNIPER LAKE
BROKEOFF MTN.
MT. HARKNESS
WILLOW LAKE
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
LASSEN VOLCANIC NATIONAL PARK.
SCALE MILES 1 ½ 0 1 2
-CALIFORNIA- MT. DIABLO MERIDIAN.
-LEGEND-
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AREA REWORKED 1945
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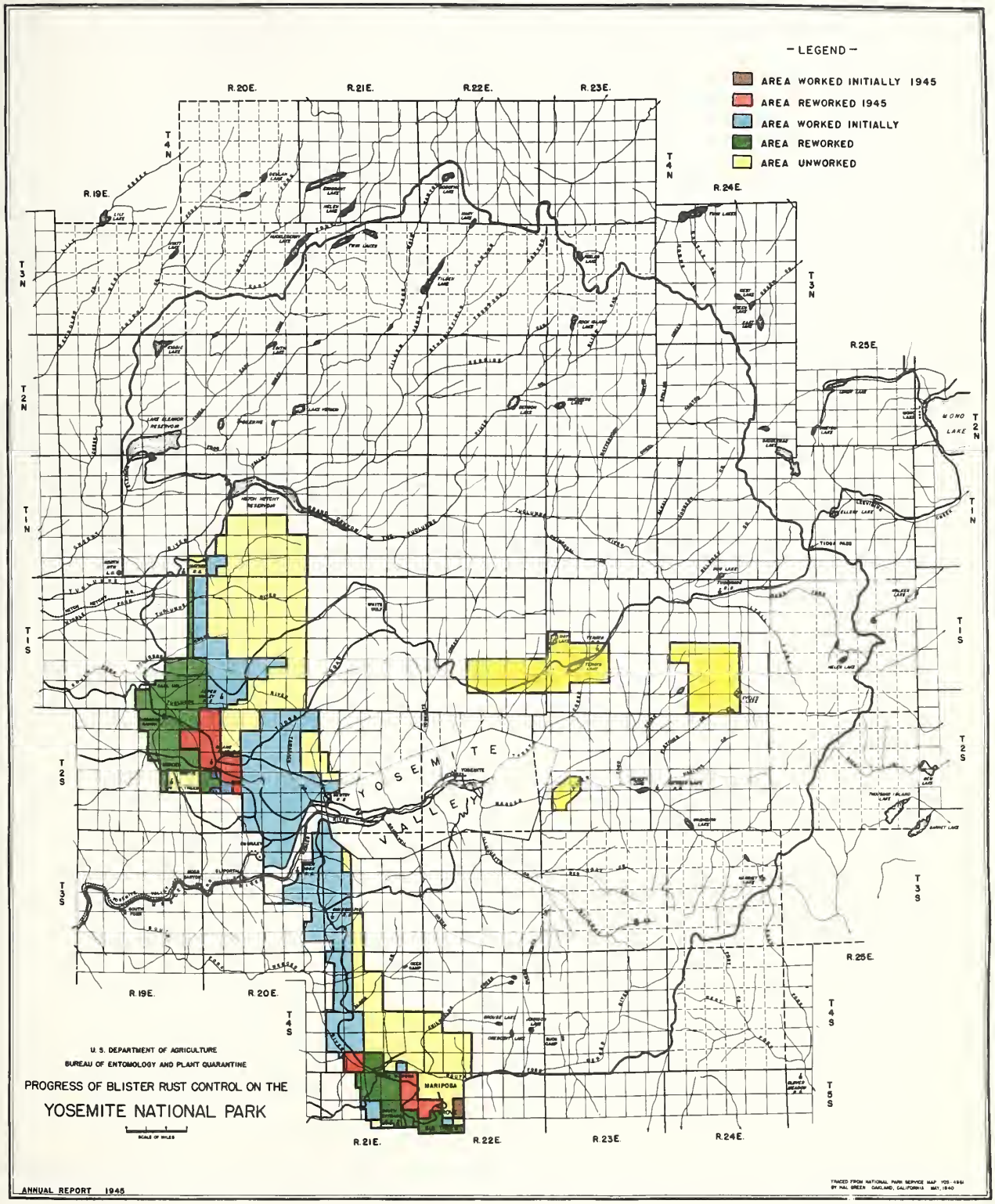
AREA REWORKED
ANNUAL REPORT 1945
H.E.G. NOV. 1938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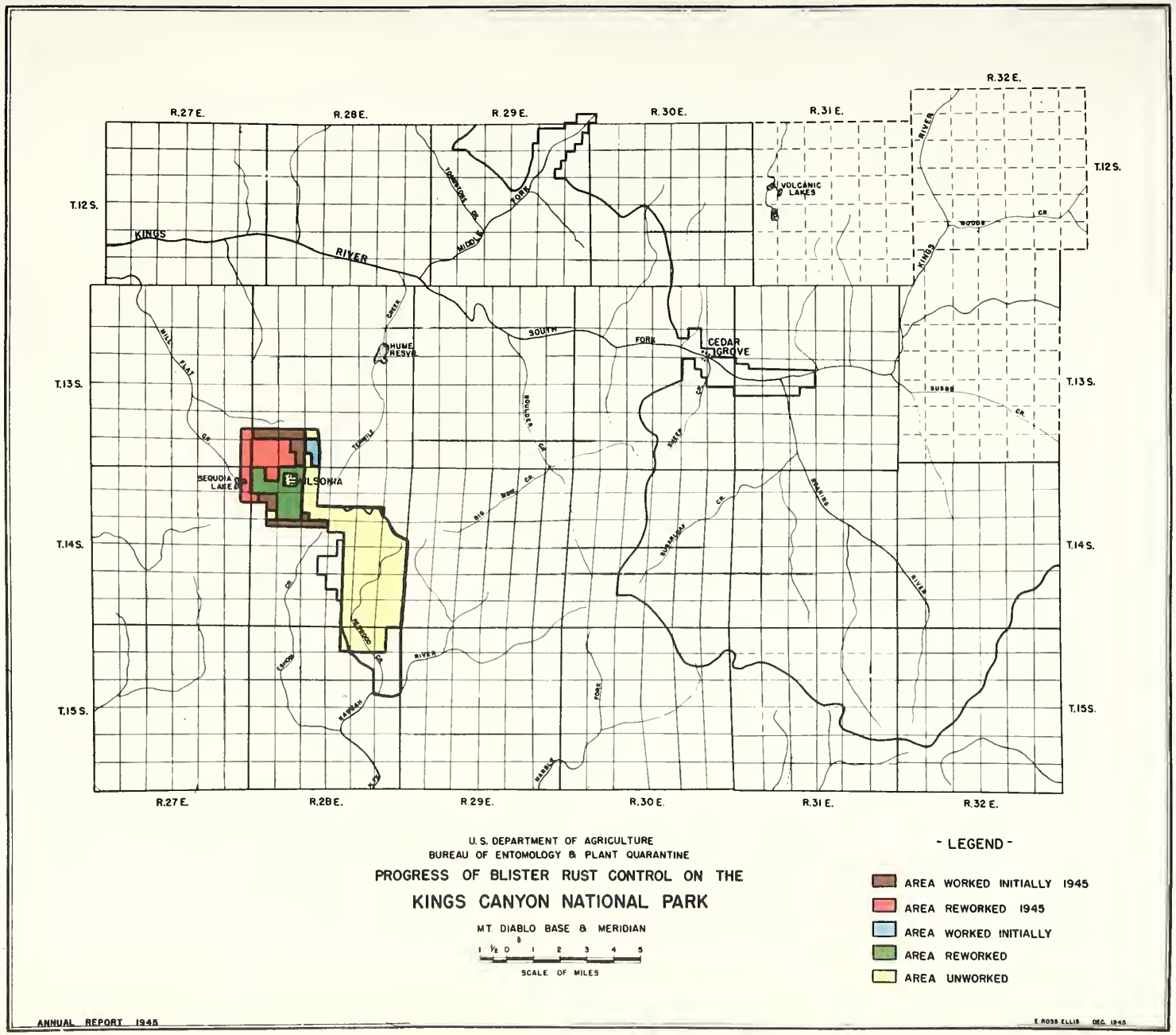
YOSEMITE VALLEY
MONO LAKE
MARIPOSA
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
YOSEMITE NATIONAL PARK
SCALE OF MILES
ANNUAL REPORT 1945
TRACED FROM NATIONAL PARK SERVICE MAP 105-4061
BY HAL GREEN OAKLAND, CALIFORNIA MAY, 1940



U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY & PLANT QUARANTINE

PROGRESS OF BLISTER RUST CONTROL ON THE

KINGS CANYON NATIONAL PARK

MT. DIABLO BASE & MERIDIAN

1 ½ 0 1 2 3 4 5

SCALE OF MILES

- LEGEND -

- AREA WORKED INITIALLY 1945
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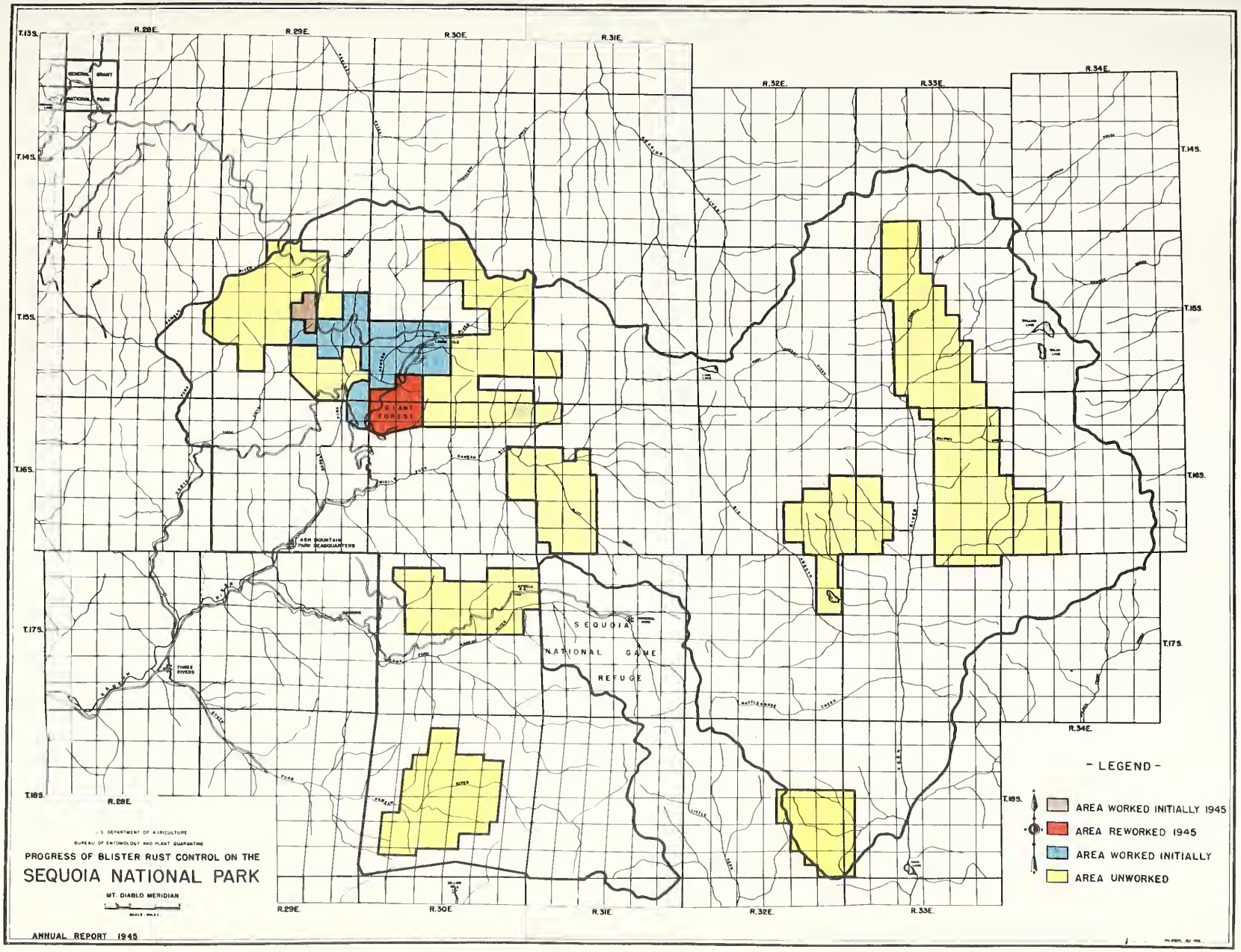
ANNUAL REPORT 1945

E. ROSS ELLIS DEC. 1945


U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
SEQUOIA NATIONAL PARK
MT. DIABLO MERIDIAN
ANNUAL REPORT 1945
GENERAL GRANT NATIONAL PARK
GIANT FOREST
ASH MOUNTAIN PARK HEADQUARTERS
THREE RIVERS
SEQUOIA NATIONAL GAME REFUGE
R.28E.
R.29E.
R.30E.
R.31E.
R.32E.
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PART III

COOPERATIVE BLISTER RUST CONTROL ON STATE AND PRIVATE LANDS

Work Project BLR-3-5

By

Carl W. Fowler, Forester, P-3

PURPOSE

The purpose of this project is the protection from white pine blister rust of those sugar pine stands of California and Oregon which are in state and private ownership.

COOPERATORS

The project, financed cooperatively by the Federal government, the states, and private timber owners, is operated under the leadership of the Bureau of Entomology and Plant Quarantine.

The State of California in 1945 increased its biennial appropriation from $100,000 to $150,000 for the control of white pine blister rust on state and privately-owned sugar pine lands, the money to be expended in the biennium July 1, 1945 to June 30, 1947. The Division of Forestry of the California State Department of Natural Resources further increased the State's participation in the program by assigning 40 youths to the project from its Calaveras Big Trees Youth Authority camp.

The Diamond Match Company and the Michigan-California Lumber Company continued their participation in the project, each contributing $2,000. A new cooperator, the Winton Lumber Company of Martell, Amador County, California, evinced its interest in the project by making a cash contribution of $1,000. A memorandum of agreement defining respective responsibilities has been signed and approved by the Bureau and the Winton Lumber Company.

The funds contributed by the State of California and by the private cooperators were matched with Federal funds. All cooperative control activities were confined to California.

LOCATION AND ORGANIZATION OF THE WORK

The selection of areas to receive control treatment was based on the policy of (1) giving first priority of work to those areas previously treated where ribes regeneration had occurred and (2) completing as much initial eradication as possible on those high rust hazard areas where blister rust is present or likely to become established in the near future.

During the 1945 season the Bureau operated eleven camps employing 500 men.

CAMPS ENGAGED IN COOPERATIVE RIBES ERADICATION DURING 1945

National Forest	Location of Camp	Size of Camp	Operating Period
Lassen	Mill Creek	45	June 19 to Aug. 31
	Rag Dump	40	June 27 to Aug. 30
	Soda Springs	45	June 19 to Aug. 27
Plumas	American House	45	June 26 to Aug. 23
	Camel Peak	40	June 22 to Aug. 18
	Walter's Mine	45	June 20 to Aug. 30
Eldorado	Cold Spring	50	July 2 to Aug. 31
	Hunter's Valley	50	June 22 to Aug. 29
	Pi Pi	50	June 20 to Sept. 12
Stanislaus	Fisher Creek	50	June 18 to Aug. 31
	Calaveras Big Trees	40	July 6 to Sept. 30

High school students again were the only source of labor available to the project. The difficulties and problems involved in the use of the 16 and 17 year old youths made it difficult to produce work of standard quantity or quality. Most of the camps were increased in strength from 5 to 10 men on July 1 when increased funds for fiscal year 1946 became available.

The lack of competent field supervisors combined with the scarcity of capable cooks and the problems of food rationing continued to make the management and administration of the camps a difficult task. The changes in hours of work and rates of pay effective July 1, 1945, which actually reduced the monthly earnings of the blister rust laborers, plus the long delayed salary payments resulting from the changes caused serious discontent.

The use of the blister rust control crews by the fire suppression agencies was responsible for numerous interruptions in the progress of the work. These interruptions resulted in the loss of many man days to the ribes eradication project.

ACCOMPLISHMENTS

Lassen National Forest

Ribes Eradication in 1945

Camp	Acres Worked Initial	Acres Worked Reeradication	Acres Worked Total	Man Days	Ribes Eradicated
Rag Dump	509	-	509	1,218	123,820
Mill Creek	2,737	-	2,737	1,533	481,457
Soda Springs		2,812	2,812	1,625	147,335
Totals	3,246	2,812	6,058	4,376	752,612

Two camps, Rag Dump and Mill Creek, were assigned to spot working and nearly completed this type of work on their respective units. Only those areas that supported numerous sugar pines and ribes and where site conditions were particularly favorable to the entry and intensification of the rust were worked. The crews from the Mill Creek camp in addition did some over-all initial eradication.

The crews from the Soda Springs camp performed reeradication work on recently cut-over lands. The number of ribes that had become established since the disturbance was small. Substantial progress has been made toward the permanent suppression of ribes on this unit.

The spot working program on the Lassen National Forest is now 80 per cent complete. The job ahead is to give complete initial coverage to those areas that have not received control treatment. To date only 40,973 acres of the 244,976 acres in state and private ownership within the control units have received initial eradication. Initial eradication on those units where the rust is present, as on the Hatchet Mt. and Rag Dump units, should be completed as soon as possible. The progress of the reeradication program has been satisfactory but each year new areas are in need of some additional work.

Plumas National Forest

Ribes Eradication in 1945

Camp	Acres Worked Initial	Man Days	Ribes Eradicated
American House	322	997	102,346
Camel Peak	210	963	128,112
Walter's Mine	824	1,254	280,511
Totals	1,356	3,214	510,969

From the American House camp the crews continued the spot working in the Lost Creek basin. This season's work practically completes the spot working program in this area.

The crews from the camps at Camel Peak and Walter's Mine continued the initial eradication of ribes on the area northeast of the South Fork of the Feather River, which was spot worked in 1942. Recently cut-over lands of the Feather River Pine Mills were treated by the crews from the Walter's Mine camp. Ribes populations were very heavy on all the areas worked. A large amount of initial eradication remains to be done on this unit.

The spot working program on the Plumas National Forest is practically complete except for a small amount of work remaining in the Lost Creek basin near American House. The reeradication work is behind schedule and should be done within the next two years.

A total of 53,483 acres of the 125,990 acres in state and private ownership has not received initial treatment. The cut-over areas in the Cascade and La Porte units should be treated soon if damage from the rust is to be held to the minimum.

Eldorado National Forest

Ribes Eradication in 1945

Camp	Acres Worked Initial	Acres Worked Reeradication	Acres Worked Total	Man Days	Ribes Eradicated
Pi Pi	-	2,922	2,922	1,546	214,774
Hunter's Valley	1,760	1,220	2,980	1,455	121,378
Cold Spring	810	-	810	1,409	217,271
Totals	2,570	4,142	6,712	4,410	553,423

The men from the camp at Pi Pi Valley, on the southern end of the forest, performed reeradication on old cut-over lands. Since 1940 this unit has been the scene of additional logging operations for cedar and white fir, and the resulting disturbance caused the establishment of many new bushes. The work outlined for the camp this year was completed.

At Hunter's Valley in the Silver Creek unit both initial and reeradication work was done on Michigan-California Lumber Company cut-over lands. A good stand of sugar pine reproduction is affording competition to the ribes and no serious regeneration problem is expected. Additional work is needed in this unit.

The Cold Spring crews performed initial eradication of ribes from mature timbered areas that supported very heavy concentrations of ribes. Only a small portion of the area was worked this season.

Thirty per cent of the total area within the control units in state and private ownership has not been worked. Recently cut-over lands in the Tiger Creek unit are in need of initial eradication now. Rust on ribes was found in this area in 1944. The Little South Fork of the Rubicon unit should also receive initial control treatment as soon as possible.

The additional treatment needed on areas previously worked has been kept current so that only a small amount of reeradication work will be required next season.

Stanislaus National Forest

Ribes Eradication in 1945

Camp	Acres Worked Reeradication	Man Days	Ribes Eradicated
Fisher Creek	2,400	1,381	267,339
Calaveras Big Trees	1,220	1,187	34,712
Totals	3,620	2,568	302,051

The fifty youths from the Fisher Creek camp did reeradication work on recently cut-over lands of the Pickering Lumber Company. The establishment of new bushes has been rapid on all areas disturbed by the logging operations. The number of ribes removed during this working was in several instances two and sometimes three times the number destroyed at the time of initial eradication. A number of additional workings will be necessary to suppress the ribes on the areas treated this year. Approximately half the area needing treatment was covered this season.

Early in July the California State Division of Forestry assigned 40 youths to ribes eradication from its Youth Authority camp at Calaveras Big Trees. Although the greater portion of their time was spent on fire suppression, the crews were able to complete reeradication work on 1,220 acres of recently cut-over lands. The crews did not complete all the necessary reeradication work in this area.

Initial treatment has been given to 86 per cent of the control areas in state and private ownership on the Stanislaus National Forest. The principal job ahead is to do the necessary reeradication work at the time needed. The reeradication work should be continued from both the

Fisher Creek and the Calaveras Big Trees camps next year. In addition some initial eradication should be done on recently cut-over lands in the Dorrington unit.

Checking

Advance and post checking consumed the major portion of the checkers' time. Since there was not a sufficient number of checkers to perform all the checking required, only the more important advance and post checks were made and only a few areas received a regular check following crew work.

After the close of the eradication camps the Bureau operated a post checking party of five men for one month on the Pinehurst unit of the Rogue River National Forest in Oregon.

Summary of Ribes Eradication on State and Private Lands in California

A total of 2,119,055 ribes were eradicated in 1945 from 17,746 acres (initial work and reeradication) with the 14,568 man days spent on the project. The 1945 program continued to give preference to those areas where ribes regeneration has been excessive and to areas where the rust is present. Although considerable progress was made this year the results were not sufficient to meet the needs of the control program. The initial job of ribes eradication on state and private lands in California is 39 per cent complete as of December 31, 1945. Of the total 876,735 acres within the control unit boundaries, 532,857 acres remain unworked.

Progress on the reeradication program has not been adequate to complete the work when needed on many areas. Any further delay may increase the number of workings necessary to secure permanent ribes suppression.

RECOMMENDATIONS

The cooperative project during the war has not been able to keep pace with the needs of the control program. The limited wartime program combined with the accelerated rate of logging have made it impossible to complete even the most essential work on those areas given first priority. The spot-working program has been one of expediency and does not give complete protection to sugar pine stands. An increase in the size of the project is needed in 1946.

The 1946 ribes eradication program should give priority of work to: (1) those lands in need of reeradication where any further delay may increase the cost of securing ribes suppression, (2) those areas where the rust is present and initial eradication is only partially completed, and (3) recently cut-over lands on which sufficient sugar pine reproduction is present to warrant protection and on which numerous ribes have become established. The urgency of the work is great, and unless the rate of progress on the over-all control program is stepped up serious losses will result.

TABLE 1

SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA IN 1945

Control Operation	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status						Acres Ribes-Free At Re-eradication
								Acres Covered		8-Hour Man Days		Ribes Eradicated		
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	Federal	Private	Federal	Private	Federal	Private	
Initial Work														
Lassen National Forest	3,246		3,246	2,751	605,277	0.85	186	1,625	1,621	984	1,767	293,695	311,582	
Plumas National Forest	1,195	161	1,356	3,214	510,969	2.69	428	267	1,089	840	2,374	103,956	407,013	
Eldorado National Forest	2,570		2,570	2,174	292,306	0.84	114	300	2,270	339	1,835	46,720	245,586	
Totals -	7,011	161	7,172	8,139	1,408,552	1.16	201	2,192	4,980	2,163	5,976	444,371	964,181	
Reeradication Work														
Lassen National Forest	2,812		2,812	1,625	147,335	0.58	52	255	2,557	179	1,446	9,211	138,124	463
Eldorado National Forest	4,142		4,142	2,236	261,117	0.54	63	1,907	2,235	1,105	1,131	182,701	78,416	3,143
Stanislaus National Forest	3,620		3,620	2,568	302,051	0.71	83	60	3,560	71	2,497	1,549	300,502	240
Totals -	10,574		10,574	6,429	710,503	0.61	67	2,222	8,352	1,355	5,074	193,461	517,042	3,846
All Workings														
Lassen National Forest	6,058		6,058	4,376	752,612	0.72	124	1,880	4,178	1,163	3,213	302,906	449,706	463
Plumas National Forest	1,195	161	1,356	3,214	510,969	2.69	428	267	1,089	840	2,374	103,956	407,013	
Eldorado National Forest	6,712		6,712	4,410	553,423	0.66	82	2,207	4,505	1,444	2,966	229,421	324,002	3,143
Stanislaus National Forest	3,620		3,620	2,568	302,051	0.71	83	60	3,560	71	2,497	1,549	300,502	240
Totals -	17,585	161	17,746	14,568	2,119,055	0.83	121	4,414	13,332	3,518	11,050	637,832	1,481,223	3,846

TABLE 2

SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA 1941-1945

Control Operation	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status									Acres Ribes-Free At Re-eradication
								Acres Covered			8-Hour Man Days			Ribes Eradicated			
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	Federal	Private	State	Federal	Private	State	Federal	Private	State	
Initial Work																	
Lassen National Forest	12,816		12,816	12,961	2,460,409	1.01	192	4,114	8,702		3,465	9,496		747,952	1,712,457		
Plumas National Forest	9,554	161	9,715	14,755	2,969,140	1.54	311	3,415	6,300		4,880	9,875		1,025,622	1,943,518		
Eldorado National Forest	10,019	430	10,449	8,007	1,147,797	0.80	115	920	9,529		752	7,255		94,670	1,053,127		
Totals -	32,389	591	32,980	35,723	6,577,346	1.10	203	8,449	24,531		9,097	26,626		1,868,244	4,709,102		
Reeradication Work																	
Lassen National Forest	9,792		9,792	3,700	459,793	0.38	47	913	8,879		356	3,344		35,431	424,362		1,569
Plumas National Forest	547		547	85	18,304	0.16	33		547			85			18,304		
Eldorado National Forest	13,526		13,526	6,396	646,543	0.47	48	3,584	8,839	1,103	1,874	4,139	383	246,318	381,519	18,706	8,423
Stanislaus National Forest	15,523		15,523	6,090	746,252	0.39	48	1,802	13,721		429	5,661		37,129	709,123		1,895
Calaveras Big Trees State Park	1,125		1,125	466	22,525	0.41	20		75	1,050		20	446		722	21,803	390
Totals -	40,513		40,513	16,737	1,893,417	0.41	47	6,299	32,061	2,153	2,659	13,249	829	318,878	1,534,030	40,509	12,277
All Workings																	
Lassen National Forest	22,608		22,608	16,661	2,920,202	0.74	129	5,027	17,581		3,821	12,840		783,383	2,136,819		1,569
Plumas National Forest	10,101	161	10,262	14,840	2,987,444	1.47	296	3,415	6,847		4,880	9,960		1,025,622	1,961,822		
Eldorado National Forest	23,545	430	23,975	14,403	1,794,340	0.61	76	4,504	18,368	1,103	2,626	11,394	383	340,988	1,434,646	18,706	8,423
Stanislaus National Forest	15,523		15,523	6,090	746,252	0.39	48	1,802	13,721		429	5,661		37,129	709,123		1,895
Calaveras Big Trees State Park	1,125		1,125	466	22,525	0.41	20		75	1,050		20	446		722	21,803	390
Totals -	72,902	591	73,493	52,460	8,470,763	0.72	116	14,748	56,592	2,153	11,756	39,875	829	2,187,122	6,243,132	40,509	12,277

TABLE 3

SUMMARY OF CHECKING ON THE COOPERATIVE PROJECT - 1945

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Oregon												
Rogue River							13,009	3.9	104.5	13,009	3.9	104.5
California												
Plumas-Lassen	4,270	5.0	69	4,874	3.0	54.5	7,920	4.1	112.5	17,064	4.0	236
Eldorado	1,850	5.0	42	1,521	4.1	24	4,444	2.8	48	7,815	3.6	114
Stanislaus	2,320	3.9	32	630	2.2	5	11,811	3.3	133	14,761	3.4	170
Totals	8,440	4.7	143	7,025	3.2	83.5	24,175	3.5	293.5	39,640	3.7	520
Pacific Coast Region												
Totals	8,440	4.7	143	7,025	3.2	83.5	37,184	3.7	398	52,649	3.8	624.5

TABLE 4

SUMMARY OF RIBES ERADICATION BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE 1925-1945***

Control Operation	Acres Worked	Acres Blocked Out	Acres Total	8-Hour Man Days	Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status: Acres Covered: Federal: National Forest	Acres Covered: Federal: O & C	Acres Covered: Federal: Total	Acres Covered: Private	Acres Covered: State	8-Hour Man Days: Federal: National Forest	8-Hour Man Days: Federal: O & C	8-Hour Man Days: Federal: Total	8-Hour Man Days: Private	8-Hour Man Days: State	Ribes Eradicated: Federal: National Forest	Ribes Eradicated: Federal: O & C	Ribes Eradicated: Federal: Total	Ribes Eradicated: Private	Ribes Eradicated: State	Acres Ribes-Free At Re-eradication
Initial Work																							
California:																							
Lassen N. F.	24.027	9.349	33.376	17.855	3.483.275	0.74	145	8.774		8.774	24.602		4.690		4.690	13.165		1.011.142		1.011.142	2.472.133		
Plumas N. F.	70.600	16.154	86.754	54.336	12.381.254	0.77	175	25.028		25.028	61.686	40	17.034		17.034	37.281	21	3.855.883		3.855.883	8.520.751	4.620	
Eldorado N. F.	87.724	26.032	113.756	63.290	16.313.655	0.72	186	26.865		26.865	84.289	2.602	14.375		14.375	47.281	1.634	3.739.264		3.739.264	12.263.500	310.831	
Stanislaus N. F.*	123.360	9.231	132.591	58.691	19.422.485	0.48	157	25.415		25.415	106.769	407	9.590		9.590	48.972	129	2.320.938		2.320.938	17.084.779	16.768	
Calaveras Big Trees State Park	1.868		1.868	1.339	188.261	0.72	101				120	1.748				21	1.318				3.260	185.001	
Sierra N. F.	50.418		50.418	76.090	15.995.271	1.51	317	35.638		35.638	14.780		54.059		54.059	22.031		10.930.704		10.930.704	5.064.567		
Subtotals	357.997	60.766	418.763	271.601	67.784.201	0.76	189	121.720		121.720	292.246	4.797	99.748		99.748	168.751	3.102	21.857.931		21.857.931	45.408.990	517.280	
Oregon:																							
Rogue River N. F.	70.413	70.039	140.452	46.630	15.798.559	0.66	224	65.155	5.394	70.549	69.903		38.574	1.154	39.728	6.902		14.493.637	196.371	14.690.008	1.108.551		
Siskiyou N. F.	20.918	36.926	57.844	10.789	761.516	0.52	36	6.662	19.539	26.201	31.343	300	1.646	3.920	5.566	5.180	43	94.865	174.417	269.282	483.906	8.328	
Klamath N. F.	4.275	293	4.568	6.489	533.529	1.52	125	3.739		3.739	829		4.607		4.607	1.882		419.719		419.719	113.810		
Nursery Sanitation	486	344	830	352	5.019	0.72	10				418	412				178	174				2.547	2.472	
Subtotals	96.092	107.602	203.694	64.260	17.098.623	0.67	178	75.556	24.933	100.489	102.493	712	44.827	5.074	49.901	14.142	217	15.008.221	370.788	15.379.009	1.708.814	10.800	
Totals	454.089	168.368	622.457	335.861	84.882.824	0.74	187	197.276	24.933	222.209	394.739	5.509	144.575	5.074	149.649	182.893	3.319	36.866.152	370.788	37.236.940	47.117.804	528.080	
Reeradication Work																							
California:																							
Lassen N. F.	11.652		11.652	4.023	471.391	0.35	40	1.630		1.630	10.022		470		470	3.553		39.879		39.879	431.512		6.749
Plumas N. F.	20.096		20.096	11.069	1.311.269	0.55	65	6.369		6.369	13.727		3.094		3.094	7.375		377.216		377.216	934.053		5.346
Eldorado N. F.	36.567		36.567	20.151	1.843.461	0.55	50	10.277		10.277	25.187	1.103	5.398		5.398	14.370	383	588.088		588.088	1.236.667	18.706	9.198
Stanislaus N. F.**	68.406		68.406	27.779	5.803.681	0.41	85	26.722		26.722	41.684		10.836		10.836	16.943		2.924.428		2.924.428	2.879.253		8.713
Calaveras Big Trees State Park	1.340		1.340	492	27.317	0.37	20				75	1.265				20	472				722	26.595	390
Sierra N. F.	1.185		1.185	1.421	223.582	1.20	189	885		885	300		1.003		1.003	418		163.997		163.997	59.585		
Subtotals	139.246		139.246	64.935	9.680.701	0.47	70	45.883		45.883	90.995	2.368	20.801		20.801	43.279	855	4.093.608		4.093.608	5.541.792	45.301	30.396
Oregon:																							
Rogue River N. F.	33.142		33.142	7.517	939.462	0.23	28	20.950		20.950	12.192		5.664		5.664	1.853		766.931		766.931	172.531		8.191
Totals	172.388		172.388	72.452	10.620.163	0.42	62	66.833		66.833	103.187	2.368	26.465		26.465	45.132	855	4.860.539		4.860.539	5.714.323	45.301	38.587
All Workings																							
California:																							
Lassen N. F.	35.679	9.349	45.028	21.878	3.954.666	0.61	111	10.404		10.404	34.624		5.160		5.160	16.718		1.051.021		1.051.021	2.903.845		6.749
Plumas N. F.	90.696	16.154	106.850	65.405	13.692.523	0.72	151	31.397		31.397	75.413	40	20.128		20.128	45.256	21	4.233.099		4.233.099	9.454.804	4.620	5.346
Eldorado N. F.	124.291	26.032	150.323	83.441	18.157.116	0.67	146	37.142		37.142	109.476	3.705	19.773		19.773	61.651	2.017	4.327.352		4.327.352	13.500.167	329.597	9.198
Stanislaus N. F.	191.766	9.231	200.997	86.470	25.226.166	0.45	132	52.137		52.137	148.453	407	20.426		20.426	65.915	129	5.245.366		5.245.366	19.964.032	16.768	8.713
Calaveras Big Trees State Park	3.208		3.208	1.831	215.578	0.57	67				195	3.013				41	1.790				3.982	211.596	390
Sierra N. F.	51.603		51.603	77.511	16.218.853	1.50	314	36.523		36.523	15.080		55.062		55.062	22.449		11.094.701		11.094.701	5.124.152		
Subtotals	497.243	60.766	558.009	336.536	77.464.902	0.68	156	167.603		167.603	383.241	7.165	120.549		120.549	212.030	3.957	25.951.539		25.951.539	50.950.782	562.581	30.396
Oregon:																							
Rogue River N. F.	103.555	70.039	173.594	54.147	16.738.021	0.52	162	86.105	5.394	91.499	82.095		44.238	1.154	45.392	8.755		15.260.558	196.371	15.456.939	1.281.082		8.191
Siskiyou N. F.	20.918	36.926	57.844	10.789	761.516	0.52	36	6.662	19.539	26.201	31.343	300	1.646	3.920	5.566	5.180	43	94.865	174.417	269.282	483.906	8.328	
Klamath N. F.	4.275	293	4.568	6.489	533.529	1.52	125	3.739		3.739	829		4.607		4.607	1.882		419.719		419.719	113.810		
Nursery Sanitation	486	344	830	352	5.019	0.72	10				418	412				178	174				2.547	2.472	
Subtotals	129.234	107.602	236.836	71.777	18.038.085	0.56	140	96.506	24.933	121.439	114.685	712	50.491	5.074	55.565	15.995	217	15.775.152	370.788	16.145.940	1.881.345	10.800	8.191
Totals	626.477	168.368	794.845	408.313	95.502.987	0.65	152	264.109	24.933	289.042	497.926	7.877	171.040	5.074	176.114	228.025	4.174	41.726.691	370.788	42.097.479	52.832.127	573.381	38.587

*Includes 7,516 acres, 3,905 man days, and 1,217,951 ribes on lands worked by the Bureau of Entomology and Plant Quarantine now in Yosemite National Park.
**Includes 480 acres, 326 man days, and 298,657 ribes on lands worked by the Bureau of Entomology and Plant Quarantine now in Yosemite National Park.
***Includes work done by the Bureau on lands of all ownership.

TABLE 5

ACREAGE OF STATE AND PRIVATE LANDS WORKED BY ALL AGENCIES IN 1945
PACIFIC COAST REGION

Control Operation	First Working Acres	Second Working Acres	Other Workings Acres	All Workings Acres
Klamath	1,470	1,373	-	2,843
Lassen	1,621	255	2,302	4,178
Plumas	1,996	1,050	708	3,754
Eldorado	2,270	1,500	3,669	7,439
Stanislaus	-	360	3,740	4,100
Sierra	-	180	-	180
California Totals	7,357	4,718	10,419	22,494
Rogue River	-	-	-	-
Siskiyou	240	280	-	520
Klamath	-	-	-	-
Oregon Totals	240	280	-	520
TOTALS	7,597	4,998	10,419	23,014

TABLE 6

ACREAGE OF STATE AND PRIVATE LANDS WORKED BY ALL AGENCIES AS OF DECEMBER 31, 1945
PACIFIC COAST REGION

Control Operation	First Working Acres	Second Working Acres	Other Workings Acres	Total Workings Acres
Klamath	15,646	2,027		17,673
Lassen	40,973	11,587	2,592	55,152
Lassen Volcanic	140	15		155
Plumas	72,507	33,439	11,171	117,117
Eldorado	90,455	42,732	8,689	141,876
Stanislaus	106,133	50,272	10,852	167,257
Calaveras Big Trees State Park	1,868	1,185	155	3,208
Sierra	16,156	6,645	320	23,121
California Totals	343,878	147,902	33,779	525,559
Rogue River	72,485	12,577	655	85,717
Siskiyou	34,631	280		34,911
Klamath	829			829
Clark McNary Nursery	830			830
McKinley Nursery	40			40
Oregon Totals	108,815	12,857	655	122,327
TOTALS	452,693	160,759	34,434	647,886

TABLE 7

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION ON STATE AND PRIVATE LANDS IN CALIFORNIA - JULY 1, 1941 TO DECEMBER 31, 1945

Cooperative Funds	Accumulative Cooperative Contributions and Federal Appropriations 7/1/41-6/30/46	Accumulative Expenditures 7/1/41-12/31/44	Expenditures Calendar Year 1945	Available Balances as of 1/1/46
State and Private Cash Contributions:				
State of California	$ 225,000	$ 124,956	$ 22,235	$ 77,809
Michigan-California Lumber Co.	8,000	4,000	3,057	943
Red River Lumber Co.*	4,000	4,000		
Diamond Match Co.	8,000	4,000	2,052	1,948
Winton Lumber Co.	1,000			1,000
Total	$ 246,000	$ 136,956	$ 27,344	$ 81,700
Federal Allotments (Project 3103.14)				
1942 Fiscal Year	$ 14,625	14,612		
1943 Fiscal Year	71,770	71,378		
1944 Fiscal Year	86,195	86,083		
1945 Fiscal Year	85,040	78,164	6,833	
1946 Fiscal Year	260,000		155,772	104,228
Total (Project 3103.14)	$ 517,630	$ 250,237	$ 162,605	$ 104,228
Grand Total	$ 763,630	$ 387,193	$ 189,949	$ 185,928

*Red River Lumber Company contributed only for 1943 and 1944 fiscal years.

NOTE: Expenditures in the amount of $38,645.78 were made during 1945 for emergency fire suppression at the call of the State of California, Division of Forestry, and the U. S. Forest Service. Reimbursements were made by these agencies to the Bureau blister rust control funds in the amount of $4,631.91 from the State of California and $34,013.87 from the Forest Service. These amounts were credited back to the funds from which expended and are a part of the balances shown available for expenditure.

PART IV

BLISTER RUST CONTROL BY THE FOREST SERVICE

Financial Project BLR-4

By

E. Ross Ellis, Agent, P-2

PURPOSE

This project has been established for the protection of the white pine stands on national forest lands from white pine blister rust.

COOPERATION

The cooperative agreements between the Bureau of Entomology and Plant Quarantine and Regions 5 and 6 of the Forest Service were continued. At the request of the Forest Service the Bureau's technical supervisors assisted in the administration of the Forest Service camps on the Eldorado, Stanislaus, and Sierra National Forests.

ORGANIZATION AND LOCATION OF THE WORK

DISTRIBUTION OF FOREST SERVICE CAMPS

National Forest	Location of Camp	Size of Camp	Type of Labor	Operating Period
		Oregon		
Rogue River	Union Creek	100	H.S.* Boys	June 11 - Aug. 30
Siskiyou	Bolan Creek	20	H.S. Boys	June 25 - Aug. 11
	Oregon Caves	50	H.S. Boys Mexican Nat.	June 6 - July 25 Aug. 5 - Sept. 15
		California		
Klamath	Beaver Creek	50	H.S. Boys Mexican Nat.	June 15 - Aug. 4 Aug. 5 - Sept. 15
	Cinnabar Springs	50	Prison	May 25 - Oct. 23
	Hungry Creek	50	Prison	May 10 - Oct. 20
Plumas	Canyon Dam	50	H.S. Boys Transient	June 11 - Aug. 29 Aug. 29 - Sept. 25
	Coldwater	40	H.S. Boys	June 27 - Aug. 22
	Mooreville Ridge	50	Prison	July 1 - Oct. 15
	Scales	50	H.S. Boys	June 18 - Aug. 31
Eldorado	China Flat	40	H.S. Boys	June 18 - Sept. 1
Stanislaus	Carl Inn	50	H.S. Boys	June 18 - Aug. 25
	Jawbone	50	H.S. Boys	June 25 - Aug. 31
Sierra	Soquel	50	H.S. Boys	June 18 - Sept. 8
	Summit	50	H.S. Boys	June 16 - Aug. 24
Totals	15 camps	750 men		

*H.S. = High School

The Forest Service operated three camps in Oregon and twelve camps in California. Three camps in California were manned by inmates from San Quentin Penitentiary and the remainder of the camps by high school boys. In August the boys in two camps were replaced with Mexican Nationals and in one with transient laborers. The San Quentin men in general performed satisfactory work. The Mexicans, when properly trained and with the field work well organized, did excellent work, whereas the quality and quantity of work of the high school crews was in general the poorest.

Charles W. Adams succeeded Charles F. Smith as Blister Rust Staff Officer on the Plumas National Forest.

Supervisory personnel was again scarce, and at times some of the camps were understaffed. Fire-fighting demands seriously hampered the eradication project. In some camps as high as 90 per cent of the man days in August and September was spent fighting fires, the loss of time averaging about 30 per cent for all camps.

WORK PERFORMED AND RESULTS ACCOMPLISHED

Rogue River National Forest

The Union Creek camp on the Upper Rogue River unit was opened with about 130 boys to take care of the heavy initial loss of manpower that could be expected. A camp manager administered the camp leaving the field men free for actual field work. Fires during the latter part of the season caused some loss of time from eradication work.

On part of the unit logging disturbances since the initial eradication have caused an increase in the ribes populations. All the cut-over areas supporting the heaviest ribes concentrations received reeradication treatment, and some areas of lighter concentrations were also worked. A small crew trained in canker elimination treated several pine infection centers within the unit.

Initial work on this unit is about 95 per cent completed, but reeradication has fallen behind during the war. The present status of ribes eradication on the entire forest is illustrated graphically in the chart following the text. Accomplishments for 1945 are as follows:

Reeradication Acres	Man Days	Ribes Destroyed
4,088	2,412	136,060

Siskiyou National Forest

The Oregon Caves camp was reconditioned and manned with about 50 high school boys, and in addition 20 boys were installed in a pack camp near the mouth of Bolan Creek. In early August the boys remaining at the Caves camp were transferred to the Bolan Creek camp; the Caves camp was then staffed with Mexican Nationals.

An attempt was made at the Caves camp to perform all the initial work remaining in the unit. The objective was not attained because of the loss

of manpower due to men leaving the job and to fire-fighting demands. A 25-man camp in 1946 should be able to complete this work. The Bolan Creek camp worked on initial eradication, removing ribes along most of the streams in the area. Dissatisfaction among the boys as a result of continuous fire-fighting caused many to quit, and the camp was closed two weeks before it had been planned to terminate the season. Initial work on this area should be continued.

The chart following the text presents the status of eradication on December 31, 1945. The following figures give the accomplishments during 1945:

Camp	Initial Work Acres	Man Days	Ribes Destroyed
Oregon Caves	3,100	1,620	74,465
Bolan Creek	378	273	11,782
Totals	3,478	1,893	86,247

Klamath National Forest

The Hungry Creek and Cinnabar Springs camps were opened in May with laborers secured from San Quentin Penitentiary. Beaver Creek camp was started on June 15 with high school boys, who were transferred to the Plumas National Forest on August 4 and replaced with Mexican Nationals. At Hungry Creek and Cinnabar Springs work was interrupted during May by rain, and during the remainder of the season more than half the time was spent in fire-fighting. Hungry Creek camp was engaged mainly on reeradication work, and Cinnabar Springs and Beaver Creek on initial eradication. Initial work on these lands should be completed as soon as possible to prevent heavy damage and loss of pine from the rust. All work of the Beaver Creek camp was in Oregon.

Of 28,681 acres of national forest land on the forest, 10,534 acres or 36 per cent have had initial treatment. The summary of 1945 work follows:

Camp	Initial Work Acres	Reeradication Acres	Man Days	Ribes Destroyed
Beaver Creek	1,047	-	2,019	203,699
Cinnabar Springs	1,748	-	1,865	90,824
Hungry Creek	354	1,373	1,753	64,996
Totals	3,149	1,373	5,637	359,519

Plumas National Forest

Four camps were operated during 1945. Coldwater and Scales camps were manned with high school boys and Mooreville Ridge camp with prison labor. Transient laborers replaced high school boys at Canyon Dam for the last month of the season.

At Canyon Dam ribes were eradicated on cut-over lands that had received initial treatment from 1938 to 1940. In the Coldwater area the crews worked on reeradication on cut-over lands that had received initial treatment in 1940 and 1941. In the Scales-Poverty Hill area practically all initial spot work has now been completed. Initial work on the Mooreville Ridge burn was continued and most of the difficult area has been finished.

Along the roads the ribes grapple powered by the Forest Service Airway Caterpillar did very efficient work.

In 1946 emphasis should first be placed on reeradication on cut-over lands, covering all such lands in urgent need of work. Initial work should be continued on the La Porte unit. Next in order of importance should be initial work on cut-over lands.

The present status of control work on the forest is shown on the accompanying chart, and the summary of 1945 work in the figures below:

Camp	Initial Work Acres	Reeradication Acres	Man Days	Ribes Destroyed
Coldwater	152	1,570	719	129,212
Scales	1,078	-	1,625	286,953
Canyon Dam	-	2,048	1,421	158,394
Mooreville Ridge	616	-	2,462	459,180
Totals	1,846	3,618	6,227	1,033,739

Eldorado National Forest

The crews from the China Flat camp reworked 5,106 acres in the Silver Fork area where logging disturbances since the previous eradication work have caused an increase in the ribes population. Much of the area has been approaching a ribes-free condition, but the opening of the stand and the disturbance of the soil have resulted in the regrowth of ribes. More workings will be necessary on most of this area to maintain adequate protection from the rust.

The accompanying chart shows the present status of control work on the forest. Initial work has been done on 66,923 acres of a total of 117,725 acres of national forest land. The seasonal summary for 1945 follows:

Camp	Reeradication Acres	Man Days	Ribes Destroyed
China Flat	5,106	1,891	337,828

Stanislaus National Forest

Two 50-man camps of high school boys were operated on the Stanislaus National Forest. Approximately 45 per cent of the available man days was lost from eradication owing to the heavy demands made on both camps for fire-fighting. An intangible loss was felt, also, because of the intermittent interruption of the field work, so that at least a 50 per cent reduction in efficiency was suffered.

Crews of the Jawbone camp performed reeradication work on areas worked initially in 1936 and 1937. The timber was removed from this area in 1940 and 1941 and ribes regeneration has been heavy. At Carl Inn the crews were engaged in reeradication work on recently cut-over lands that had received initial treatment from 1938 to 1940.

On the Stanislaus National Forest initial work has been completed on 76,784 acres of a total of 106,691 acres of national forest land. The

chart following the text shows the present status of control work on the entire forest; the accomplishments for the 1945 field season are tabulated below:

Camp	Reeradication Acres	Man Days	Ribes Destroyed
Jawbone	960	1,155	172,141
Carl Inn	1,072	1,127	123,153
Totals	2,032	2,282	295,294

Sierra National Forest

Two 50-man camps located at Soquel and Summit Camp were manned with high school boys who removed ribes from areas last worked from 1938 to 1942. Because of short seasons and insufficient labor in recent years the reeradication program has fallen behind what is desirable, and only selected sites of heaviest ribes regeneration were worked.

The Sierra reeradication problem now is generally one of working men through heavy brush and not, as in former eradications, a problem of removing great numbers of ribes. Ribes regeneration has apparently been checked, and reeradication should be accomplished at the proper time in order to preserve the foothold now gained. An average of 10,000 man days per year for the next three years should be expended on reeradication to bring the most urgent work up to date.

On the Sierra National Forest 46,705 acres have been covered initially of 175,391 acres of national forest land. The 1945 seasonal summary follows:

Camp	Reeradication Acres	Man Days	Ribes Destroyed
Soquel	1,220	1,453	358,994
Summit	1,077	1,371	167,480
Totals	2,297	2,824	526,474

Summary of Ribes Eradication

The wartime policies of eradicating ribes that had regenerated on cut-over lands and spot working of high hazard areas were continued in 1945. These policies have produced the desired results, in that the investment in initially worked lands has been protected and a substantial acreage in addition has been given partial protection. Some overall initial work was done on areas in which the rust is established.

The seasonal summary of ribes eradication on national forest lands follows:

State	Initial Work Acres	Reeradication Acres	Man Days	Ribes
Oregon	4,525	4,088	6,324	426,006
California	3,948	14,426	16,842	2,349,155
Totals	8,473	18,514	23,166	2,775,161

The chart following the text gives the present status of control work on each forest and for each state. The detailed results of the season's work

are included in the section for each forest, and in further detail in the tables following this text.

Checking

The Bureau performed all checking work on the Forest Service project and was reimbursed by the Forest Service. Again the shortage of checkers forced the slighting of regular checking, to favor the more important advance and post checking.

Checking accomplishments are summarized in Table 3.

EXPENDITURES

During the calendar year of 1945 a total of $352,555 was expended on the Forest Service project. Of this amount $78,803 was spent in Oregon and $273,752 in California.

RECOMMENDATIONS

With the end of the war we can look forward to a possible expanded program for the future and therefore to an increase in the scope of control work. The following order of treatment is recommended for 1946.

1. Initial work should be completed on those areas where a loss of pine from the disease is already taking place.

2. Areas where spot work control measures so far applied have been inadequate to hold the rust in check should be considered next.

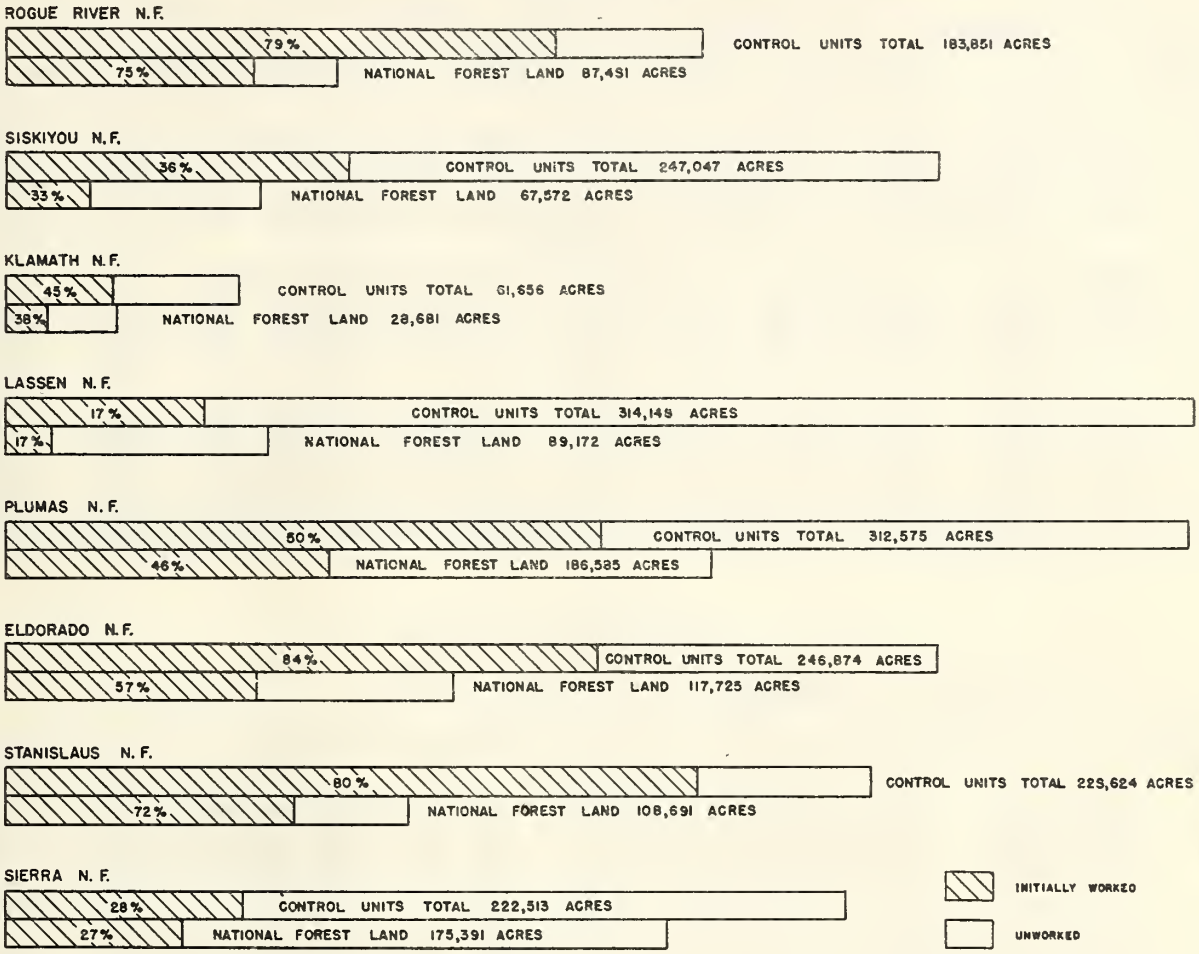
3. Reeradication should be performed on those areas for which any further delay would increase the number of workings necessary to secure permanent ribes suppression.

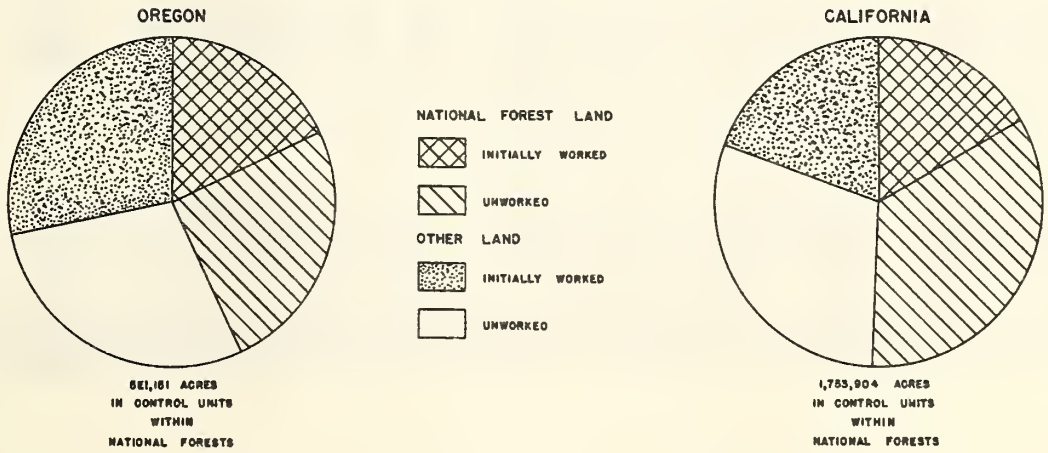
4. Initial overall coverage should then be considered on those areas where spot work control measures have apparently held the development of the rust in check.

5. Initial work deferred during the war should be done, the relative imminence of rust damage determining the order of work.

THE STATUS OF INITIAL RIBES ERADICATION WITHIN NATIONAL FORESTS - CALIFORNIA & OREGON

DECEMBER 1945





ANNUAL REPORT 1945 ERE

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE IN 1945*

National Forest	Acres Worked	Acres Blocked Out	Acres Total	8-Hour Man Days	Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status — Acres Covered — Federal: National Forest	Federal: O & C	Federal: Total	Private	8-Hour Man Days — Federal: National Forest	Federal: O & C	Federal: Total	Private	Ribes Eradicated — Federal: National Forest	Federal: O & C	Federal: Total	Private	Acres Ribes-Free At Re-eradication
Initial Work																				
California:																				
Klamath	2,102		2,102	2,701	143,958	1.28	68	632		632	1,470	599		599	2,102	17,203		17,203	126,755	
Plumas	1,762	84	1,846	4,320	739,864	2.45	454	939		939	907	1,663		1,663	2,657	305,462		305,462	493,402	
Subtotals	3,864	84	3,948	7,021	947,822	1.82	240	1,571		1,571	2,377	2,262		2,262	4,759	323,665		323,665	620,157	
Oregon:																				
Siskiyou	1,982	1,496	3,478	1,893	86,247	0.96	44	2,326	912	3,238	240	1,372	438	1,810	83	71,813	11,696	83,509	2,738	
Klamath	1,047		1,047	2,019	203,699	1.93	195	396	651	1,047		975	1,044	2,019		61,520	142,179	203,699		
Subtotals	3,029	1,496	4,525	3,912	289,946	1.29	96	2,722	1,563	4,285	240	2,347	1,482	3,829	83	133,333	153,875	287,208	2,738	
Totals	6,893	1,580	8,473	10,933	1,237,768	1.59	179	4,293	1,563	5,856	2,617	4,609	1,482	6,091	4,842	456,998	153,875	610,873	622,895	
Reeradication Work																				
California:																				
Klamath	1,373		1,373	917	11,862	0.67	9				1,373				917				11,862	
Plumas	3,618		3,618	1,907	233,875	0.53	65	1,860		1,860	1,758	885		885	1,022	121,100		121,100	112,775	140
Eldorado	5,106		5,106	1,891	337,828	0.37	66	2,172		2,172	2,934	839		839	1,052	151,737		151,737	186,091	3,481
Stanislaus	2,032		2,032	2,282	296,294	1.12	145	1,492		1,492	540	1,687		1,687	595	191,805		191,805	103,489	215
Sierra	2,297		2,297	2,624	526,474	1.23	229	2,117		2,117	180	2,595		2,595	229	458,464		458,464	68,020	
Subtotals	14,426		14,426	9,821	1,405,333	0.68	97	7,641		7,641	6,785	6,006		6,006	3,815	923,096		923,096	482,237	3,836
Oregon:																				
Rogue River	4,088		4,088	2,412	136,060	0.59	33	4,088		4,088		2,412		2,412		136,060		136,060		344
Totals	18,514		18,514	12,233	1,541,393	0.66	83	11,729		11,729	6,785	8,418		8,418	3,815	1,059,156		1,059,156	482,237	4,180
All Workings																				
California:																				
Klamath	3,475		3,475	3,618	155,820	1.04	45	632		632	2,843	599		599	3,019	17,203		17,203	138,617	
Plumas	5,380	84	5,464	6,227	1,033,739	1.16	192	2,799		2,799	2,665	2,548		2,548	3,679	427,562		427,562	605,177	140
Eldorado	5,106		5,106	1,891	337,828	0.37	66	2,172		2,172	2,934	839		839	1,052	151,737		151,737	186,091	3,481
Stanislaus	2,032		2,032	2,282	296,294	1.12	145	1,492		1,492	540	1,687		1,687	595	191,805		191,805	103,489	215
Sierra	2,297		2,297	2,624	526,474	1.23	229	2,117		2,117	180	2,595		2,595	229	458,464		458,464	68,020	
Subtotals	18,290	84	18,374	16,642	2,349,155	0.92	128	9,212		9,212	9,162	8,268		8,268	8,574	1,246,771		1,246,771	1,102,394	3,836
Oregon:																				
Rogue River	4,088		4,088	2,412	136,060	0.59	33	4,088		4,088		2,412		2,412		136,060		136,060		344
Siskiyou	1,982	1,496	3,478	1,893	86,247	0.96	44	2,326	912	3,238	240	1,372	438	1,810	83	71,813	11,696	83,509	2,738	
Klamath	1,047		1,047	2,019	203,699	1.93	195	396	651	1,047		975	1,044	2,019		61,520	142,179	203,699		
Subtotals	7,117	1,496	8,613	6,324	426,006	0.89	60	6,810	1,563	8,373	240	4,759	1,482	6,241	83	269,381	153,875	423,268	2,738	344
Totals	25,407	1,580	26,987	23,166	2,775,161	0.91	109	16,022	1,563	17,585	9,402	13,027	1,482	14,509	8,657	1,516,154	153,875	1,670,029	1,105,132	4,180

*Includes work done by the Forest Service on lands of all ownership.

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE 1933-1945**

National Forest	Acres Worked	Acres Blocked Out	Acres Total	8-Hour Man Days	Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status — Acres Covered — Federal: National Forest	Federal: O & C	Federal: Total	Private	8-Hour Man Days — Federal: National Forest	Federal: O & C	Federal: Total	Private	Ribes Eradicated — Federal: National Forest	Federal: O & C	Federal: Total	Private	Acres Ribes-Free At Re-eradication
Initial Work																				
California:																				
Klamath	21,152	893	22,045	23,850	2,246,432	1.13	106	6,399		6,399	15,646	6,637		6,637	17,213	972,871		972,871	1,273,561	
Lassen	17,588	1,399	19,087	16,936	1,941,142	0.96	110	2,716		2,716	16,371	2,268		2,268	14,868	302,147		302,147	1,638,995	
Plumas	61,758	9,237	70,995	66,107	10,797,608	1.07	175	60,214		60,214	10,781	45,922		45,922	20,185	8,072,331		8,072,331	2,725,277	
Eldorado	38,503	5,119	43,622	26,021	6,968,575	0.68	181	40,056		40,056	3,564	19,123		19,123	6,898	5,827,361		5,827,361	1,141,214	
Stanislaus*	49,411	9,121	58,532	32,122	7,839,934	0.65	159	51,739		51,739	6,793	23,255		23,255	8,867	5,735,570		5,735,570	2,104,364	
Sierra	11,960	483	12,443	16,461	7,846,008	3.05	656	11,067		11,067	1,376	14,110		14,110	2,351	7,202,352		7,202,352	643,656	
Subtotals	200,472	26,252	226,724	201,497	37,639,699	1.01	188	172,193		172,193	54,531	131,315		131,315	70,182	28,112,632		28,112,632	9,527,067	
Oregon:																				
Rogue River	772		772	1,058	130,629	1.37	169	772		772		1,058		1,058		130,629		130,629		
Siskiyou	4,697	5,062	9,759	5,437	202,317	1.16	43	6,035	2,118	8,153	1,606	4,171	959	5,130	307	167,821	24,859	192,680	9,637	
Klamath	1,047		1,047	2,019	203,699	1.93	195	396	651	1,047		975	1,044	2,019		61,520	142,179	203,699		
White Pine Plantation	145	535	680	373	124,744	2.57	860	680		680		373		373		124,744		124,744		
Subtotals	6,661	5,597	12,258	8,887	661,389	1.33	99	7,863	2,769	10,652	1,606	6,577	2,003	8,580	307	484,714	167,038	651,752	9,637	
Totals	207,133	31,849	238,982	210,384	38,301,088	1.02	185	180,076	2,769	182,845	56,137	137,892	2,003	133,895	70,489	28,597,346	167,038	28,764,384	9,536,704	
Reeradication Work																				
California																				
Klamath	3,063		3,063	2,287	59,752	0.75	20	1,036		1,036	2,027	790		790	1,497	39,934		39,934	19,858	190
Lassen	4,779		4,779	2,346	204,095	0.49	43	622		622	4,157	261		261	2,085	5,014		5,014	199,081	6,121
Plumas	69,345		69,345	40,959	4,874,903	0.59	70	38,462		38,462	30,883	23,476		23,476	17,483	2,458,178		2,458,178	2,416,725	24,393
Eldorado	56,231		56,231	32,534	2,454,969	0.58	44	31,100		31,100	25,121	19,297		19,297	13,237	1,257,931		1,257,931	1, 7, 3	10,251
Stanislaus	70,907		70,907	39,823	4,615,664	0.56	65	51,027		51,027	19,880	24,666		24,666	15,157	3,778,288		3,778,288	837,376	17,623
Sierra	43,356		43,356	32,362	10,254,044	0.75	237	36,691		36,691	6,665	28,366		28,366	3,996	9,374,874		9,374,874	879,170	980
Subtotals	247,681		247,681	150,311	22,463,467	0.61	91	158,938		158,938	88,743	96,846		96,846	53,465	16,914,219		16,914,219	5,549,248	59,558
Oregon:																				
Rogue River	13,475		13,475	8,954	598,797	0.66	44	12,435		12,435	1,040	8,429		8,429	525	566,017		566,017	32,780	344
White Pine Plantation	212		212	228	29,957	1.08	141	212		212		228		228		29,957		29,957		395
Subtotals	13,687		13,687	9,182	628,754	0.67	46	12,647		12,647	1,040	8,657		8,657	525	595,974		595,974	32,780	739
Totals	261,368		261,368	159,493	23,092,221	0.61	88	171,585		171,585	89,783	105,503		105,503	53,990	17,510,193		17,510,193	5,582,028	60,297
All Workings																				
California:																				
Klamath	24,215	893	25,108	26,137	2,306,224	1.08	95	7,435		7,435	17,673	7,427		7,427	18,710	1,012,805		1,012,805	1,293,419	190
Lassen	22,467	1,399	23,866	19,282	2,145,237	0.86	95	3,338		3,338	20,528	2,529		2,529	16,953	307,161		307,161	1,838,076	6,121
Plumas	131,103	9,237	140,340	107,066	15,672,511	0.82	120	98,676		98,676	41,664	69,398		69,398	37,668	10,530,509		10,530,509	5,142,002	24,393
Eldorado	94,734	5,119	99,853	58,555	9,423,544	0.62	99	71,158		71,158	28,685	38,420		38,420	20,135	7,085,292		7,085,292	2,338,252	10,251
Stanislaus	120,318	9,121	129,439	71,945	12,455,598	0.60	104	102,766		102,766	26,673	47,911		47,911	24,024	9,513,858		9,513,858	2,941,740	17,623
Sierra	55,316	483	55,799	48,823	18,100,052	1.24	327	47,758		47,758	8,041	42,476		42,476	6,347	16,577,226		16,577,226	1,522,826	980
Subtotals	448,153	26,252	474,405	351,808	60,103,166	0.79	134	331,131		331,131	143,274	228,161		228,161	123,847	45,026,851		45,026,851	15,076,315	59,558
Oregon:																				
Rogue River	14,247		14,247	10,012	729,426	0.70	51	13,207		13,207	1,040	9,487		9,487	525	696,646		696,646	32,780	344
Siskiyou	4,697	5,062	9,759	5,437	202,317	1.16	43	6,035	2,118	8,153	1,606	4,171	959	5,130	307	167,821	24,859	192,680	9,637	
Klamath	1,047		1,047	2,019	203,699	1.93	195	396	651	1,047		975	1,044	2,019		61,520	142,179	203,699		
White Pine Plantation	357	535	892	601	154,701	1.68	433	892		892		601		601		154,701		154,701		395
Subtotals	20,348	5,597	25,945	18,069	1,290,143	0.89	63	20,530	2,769	23,299	2,646	15,234	2,003	17,237	832	1,080,688	167,038	1,247,726	42,417	739
Totals	468,501	31,849	500,350	369,877	61,393,309	0.79	131	351,661	2,769	354,430	145,920	243,395	2,003	245,398	124,479	46,107,539	167,038	46,274,577	15,118,732	60,297

*Includes 690 acres, 1,672 man days, and 493,900 ribes worked by the Forest Service now in Yosemite National Park.
**Includes work done by the Forest Service on lands of all ownership.

TABLE 3

SUMMARY OF CHECKING ON THE FOREST SERVICE PROJECT - 1945

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Oregon												
Rogue River	3,675	4.6	70.5	-	-	-	2,530	4.1	36	6,205	4.4	106.5
Siskiyou	1,509	5.1	41.5	4,026	4.2	83	-	-	-	5,535	4.4	124.5
Totals	5,184	4.8	112	4,026	4.2	83	2,530	4.1	36	11,740	4.4	231
California												
Klamath	7,170	3.9	139	2,019	2.5	35	-	-	-	9,189	2.8	174
Plumas-Lassen	1,200	5.0	30.5	616	2.6	6.5	8,543	3.3	97	10,359	3.5	134
Eldorado	2,473	4.2	38	2,320	3.4	20	1,932	2.5	14	6,725	3.4	72
Stanislaus	1,200	2.7	10.5	-	-	-	5,627	3.0	48.5	6,827	2.9	59
Sierra	1,863	4.9	71	-	-	-	931	2.6	15	2,794	4.1	86
Totals	13,906	4.1	289	4,955	2.9	61.5	17,033	3.1	174.5	35,894	3.5	525
Pacific Coast Region												
Totals	19,090	4.3	401	8,981	3.5	144.5	19,563	3.2	210.5	47,634	3.7	756

TABLE 4
(Omnibus Table 2, Sheet 1)

ACREAGE WORKEL ON NATIONAL FOREST LANDS 1945
PACIFIC COAST REGION

National Forests	First Working Acres	Second Working Acres	Other Workings Acres	All Workings Acres
Klamath	632			632
Lassen	1,625	55	200	1,880
Plumas	1,206	1,630	230	3,066
Eldorado	300	80	3,999	4,379
Stanislaus		420	1,132	1,552
Sierra		885	1,232	2,117
California Totals	3,763	3,070	6,793	13,626
Rogue River		4,088		4,088
Siskiyou	3,251	404		3,655
Klamath	396			396
Oregon Total	3,647	4,492		8,139
Totals	7,410	7,562	6,793	21,765

TABLE 5
(Omnibus Table B, Sheet 1)

STATUS OF RIBES ERADICATION ON NATIONAL FOREST LANDS, DECEMBER 31, 1945
PACIFIC COAST REGION

National Forests	Total Acres		First Working		Second Working	Other Workings	On Maintenance		Remaining Work	
	White Pine	Control Area	Acres	Per Cent	Acres	Acres	Acres	Per Cent	Unworked Acres	Requiring Rework Acres
Mendocino	21,017	21,017							21,017	
Trinity	122,575	122,575							122,575	
Klamath	19,650	19,650	6,399	33	1,036				13,251	
Shasta	3,611	3,611							3,611	
Lassen	69,172	69,172	11,490	17	2,052	200			57,682	
Plumas	186,585	186,585	85,242	46	37,968	6,863			101,343	
Tahoe	19,925	19,925							19,925	
Eldorado	117,725	117,725	66,923	57	35,777	5,600			50,802	
Stanislaus	106,691	106,691	76,784	72	49,687	28,022			29,907	
Sierra	173,391	173,391	46,705	27	25,341	12,235			126,686	
Sequoia	43,930	43,930							43,930	
California Totals	884,272	884,272	293,543	33	151,861	52,920	164,271	19	590,729	129,272
Rogue River	87,491	87,491	65,905	75	28,164	5,221			21,586	
Siskiyou	67,572	67,572	22,368	33	440				45,204	
Siuslaw	680	680	680	100	127	85				
Umpqua	60,353	60,353							60,353	
Klamath	9,031	9,031	4,135	46					4,896	
Oregon Totals	225,127	225,127	93,088	41	28,731	5,306	64,914	29	132,039	28,174
Totals	1,109,399	1,109,399	386,631	35	180,592	58,226	229,185	21	722,768	157,446

TABLE 6

SUMMARY OF RIBES ERADICATION BY AGENCY ON NATIONAL FOREST LAND 1925-1945

State	Acreage Of National Forest Land In Control Area	Calendar Year	Acreage Worked By									Total Acreage Worked By All Agencies			Total Acreage According To Present Ownership (Initial Erad.)	Unworked Acreage
			Forest Service			Bureau			O & C							
			Initial Work	Reeradi-cation	Total	Initial Work	Reeradi-cation	Total	Initial Work	Reeradi-cation	Total	Initial Work	Reeradi-cation	Total		
California	884,272	1926 to 1944	170,622	151,297	321,919	119,528	43,661	163,189				290,150	194,958	485,108	293,543*	590,729
		1945	1,571	7,641	9,212	2,192	2,222	4,414				3,763	9,863	13,626		
	Totals - - - - -		172,193	158,938	331,131	121,720	45,883	167,603				293,913	204,821	498,734		
Oregon	225,127	1925 to 1944	5,139	8,559	13,698	78,165	22,676	100,841	8,746	36	8,782	92,050	31,271	123,321	93,088**	132,039
		1945	2,722	4,088	6,810				925	404	1,329	3,647	4,492	8,139		
	Totals - - - - -		7,861	12,647	20,508	78,165	22,676	100,841	9,671	440	10,111	95,697	35,763	131,460		
Total Pacific Coast Region	1,109,399		180,054	171,585	351,639	199,885	68,559	268,444	9,671	440	10,111	389,610	240,584	630,194	386,631	722,768

*Excludes 370 acres now in Yosemite National Park.
**Excludes 2,609 acres of initial work in abandoned Mt. Hood unit.

PART V

BLISTER RUST CONTROL BY THE NATIONAL PARK SERVICE

Financial Project BLR-5

By

John N. Mitchell, Forester, P-2

PURPOSE

The purpose of this project is to protect from blister rust the white pine stands of esthetic and recreational importance within the National Parks.

COOPERATIVE AGREEMENTS

Individual agreements between the various Parks and the Bureau of Entomology and Plant Quarantine which had been in effect for several years were the basis of cooperation in blister rust control work. After June 1945, the several agreements were superseded by an agreement between the Department of Agriculture and the Department of the Interior relating to cooperation in blister rust control work. For the full text of this agreement see page 10. Thereafter nothing more formal than arrangements in writing between the Parks and the Pacific Coast Regional Office of the Bureau are required.

ORGANIZATION OF WORK AND ACCOMPLISHMENTS

Five blister rust control camps were located within the National Parks. Yosemite and Sequoia-Kings Canyon National Parks each operated two camps. The camp in Lassen Volcanic National Park was operated and financed by the Bureau, for which reimbursement was subsequently made by the Park Service.

The camps in Sequoia-Kings Canyon National Parks were administered by Assistant Park Superintendent Daniel J. Tobin. The Yosemite camps were in charge of Maurice E. Thede, Associate Regional Forester. Representatives of the Bureau supervised the field work in both Parks.

The Cedar Springs Camp in the General Grant Grove Section was manned with workers assigned from the Civilian Public Service camp of Sequoia-Kings Canyon National Parks. Labor for the other camps was recruited by the Bureau from 16 and 17 year old high school students; most of the supervisory personnel were school teachers.

LOCATION, SIZE, AND OPERATING DATES OF BRC CAMPS IN THE NATIONAL PARKS

National Park	Location of Camp	Size of Camp	Operating Period
Lassen Volcanic	Lost Creek	35 workers	July 2 - Aug. 29
Yosemite	Crane Flat	100 workers	June 14 - Aug. 24
	Wawona	50 workers	May 18 - Aug. 31
Sequoia-Kings Canyon	Red Fir	40 workers	June 20 - Aug. 25
	Cedar Springs	20 workers	May 22 - Sept. 27

Lassen Volcanic National Park

Lost Creek camp opened on July 2 with 35 high school boys, most of whom remained on the job until the camp closed on August 29. All remaining initial work in the park was completed, and all areas which had been previously treated and needed reworking were also covered. Much of the area was ribes-free, it being necessary to work only scattered areas within the control units. No further ribes eradication should be needed in this park before 1949.

Yosemite National Park

The Crane Flat camp averaged a field strength of 71 high school boys for a season of 57 work days. Forty-seven per cent of the time was put on the second working of 2,479 acres, largely mature timber, and 53 per cent on the third working of 1,309 acres about half of which was cut-over covered with dense brush and numerous ribes. A crew of 8 to 10 men worked in the vicinity of Crane Flat from August 24, when the majority of the crew left, until October 26. In addition to ribes eradication work, these men during bad weather made preparations for the construction of two other camps for next season.

The camp at Wawona averaged 30 high school laborers in the field for an operating period of 74 work days. Initial eradication of ribes from 400 acres of mature timber east of the Mariposa Grove of Bigtrees required 46 per cent of the time, and the second working of 1,343 acres of timber and cut-over took 54 per cent.

Early in 1945 the National Park Service set up within class A priority areas in Yosemite National Park four sub areas to receive the highest priority in future operations. The progress made and the work remaining in class A priority and its subdivisions are indicated in the following table:

STATUS OF RIBES ERADICATION WORK ON CLASS A PRIORITY AREAS OF YOSEMITE NATIONAL PARK

Area	Acres				Acres Ready for Rework	
	Total	Treated Initially	Unworked	Reworked	Urgent	Not Urgent
Priority A1						
Big Oak Flat Road	9,270	8,950	320	6,710	1,600	3,830
Mariposa Grove	3,000	2,800	200	2,280	160	-
Wawona Road	6,480	6,480	-	-	4,000	2,480
Total	18,750	18,230	520	8,990	5,760	6,310
Priority A2						
Alder Creek	1,920	1,280	640	-	-	1,280
Total Priority A1 and A2	20,670	19,510	1,160	8,990	5,760	7,590
Priority A3	56,730	34,771	21,959	9,961	5,090	15,090
Total Class A Area	77,400	54,281	23,119	18,951	10,850	22,680

The acreages listed in the table as "acres ready for rework" are only approximate. Estimates are based in part on post checks and other field examination, but for some areas simply on time elapsed since the last working (4 to 7 years) and the ribes conditions encountered at that time. To avoid loss of progress made toward eventual ribes suppression, areas considered "urgent" must have treatment in 1946. Although areas considered "not urgent" are ready for rework, no significant loss of progress is anticipated should several more seasons pass before they can be treated, provided that the reeradication program does not cumulatively fall behind to such an extent that an unexpected appearance and buildup of the rust would cause excessive damage before all the rework could be completed.

The National Park Service has tentative plans to man five camps during the 1946 season providing for the completion of initial work in the priority A1 areas and for an adequate rework program.

Sequoia-Kings Canyon National Parks

The camp at Cedar Springs in the General Grant Grove Section was the first to use Civilian Public Service workers as blister rust control labor. These men proved themselves the best workers used during the war period. As compared to high school students, they are more dependable and are accustomed to hard work. Under adequate supervision the small crew accomplished a large amount of work of high quality. The camp operated for 106 work days with an average strength of 19 men. Sixty-six per cent of the man days were used in initial eradication of ribes from 1,193 acres, largely of cut-over land, in the quarter-mile wide protective strip adjoining the Grant Grove Section. The remainder of the time, 34 per cent, was used in a second working of 1,569 acres within and adjacent to the Grant Grove.

The Red Fir camp in Sequoia Park operated with an average field strength of 29 high school boys for a period of 53 work days. Of the total time, 83 per cent was used in the initial working of 845 acres, which included some of the heaviest populations of ribes known to grow in virgin timber. The remaining 17 per cent of the time was used in the second working of 963 acres in the vicinity of the Giant Forest. It is worthy of note that 2,270 acres in the Giant Forest area given initial eradication six and seven years ago was still sufficiently ribes-free so that no work was necessary.

STATUS OF RIBES ERADICATION WORK ON CLASS A PRIORITY AREAS OF SEQUOIA-KINGS CANYON NATIONAL PARKS

Area	Acres				Acres Ready for Rework	
	Total	Treated Initially	Unworked	Reworked	Urgent	Not Urgent
Giant Forest Unit	21,000	11,805	9,295	3,233	1,920	1,560
General Grant Grove Unit	5,470	4,434	1,036	2,601	655	-
Redwood Mountain Unit	7,100	-	7,100	-	-	-
Totals	33,570	16,239	17,431	5,834	2,575	1,560

The Cedar Grove unit of 5,500 acres, in which no control work has been done, is not included in the foregoing table because the unit has been placed in a deferred priority class. The 3,233 acres reworked in the Giant Forest unit include 2,270 acres found to be sufficiently ribes-free as to require no crew work at the time of reeradication. The General Grant Grove unit is shown to contain 5,470 acres: this figure is 230 acres less than original estimates now in the master tables which will be corrected at the next revision.

It is recommended that in 1946 a camp be located again in the General Grant Grove Section to complete the initial work there, to bring all reeradication to date, and to start initial work in the adjacent Redwood Mountain unit. Also recommended are two camps within the Giant Forest unit: one at Red Fir, the other at Bridge Camp. Having camps at these sites, the reeradication work can be brought current and initial work can be continued on the more important areas remaining to be worked.

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE IN 1945*

National Park	Acres Worked	Acres Blocked Out	Acres Total	8-Hour Man Days	Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Acres Ribes-Free At Re-eradication
Initial Work								
Lassen Volcanic	888	2,787	3,675	484	56,335	0.52	63	
Yosemite	400		400	1,040	155,172	2.60	388	
Kings Canyon	1,193		1,193	1,365	158,692	1.14	133	
Sequoia	845		845	1,277	142,975	1.51	169	
Totals -	3,326	2,787	6,113	4,146	513,174	1.25	154	
Reeradication Work								
Lassen Volcanic	1,080		1,080	487	25,225	0.45	23	2,334
Yosemite	5,131		5,131	5,205	343,884	1.01	67	370
Kings Canyon	1,569		1,569	694	57,824	0.44	37	
Sequoia	963		963	254	8,202	0.26	9	2,270
Totals -	8,743		8,743	6,640	435,135	0.76	50	4,974
All Workings								
Lassen Volcanic	1,968	2,787	4,755	951	81,560	0.48	41	2,334
Yosemite	5,531		5,531	6,245	499,056	1.13	90	370
Kings Canyon	2,762		2,762	2,059	216,516	0.74	79	
Sequoia	1,808		1,808	1,531	151,177	0.85	84	2,270
Totals -	12,069	2,787	14,856	10,786	948,309	0.89	79	4,974

*This table is also a summary of ribes eradication on National Park land in 1945 since all land worked by the Park Service was National Park land.

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE 1933-1945***

National Park	Acres Worked	Acres Blocked Out	Acres Total	8-Hour Man Days	Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status: Acres Covered: Federal	Acres Covered: Private	8-Hour Man Days: Federal	8-Hour Man Days: Private	Ribes Eradicated: Federal	Ribes Eradicated: Private	Acres Ribes-Free At Re-eradication
Initial Work														
Crater Lake	406	3,226	3,632	412	130,162	1.01	321	3,632		412		130,162		
Lassen Volcanic	6,610	10,955	17,565	5,734	771,673	0.87	117	17,425	140	5,679	55	756,696	14,977	
Yosemite*	43,221	6,536	49,757	82,637	11,143,587	1.91	258	49,757		82,637		11,143,587		
Kings Canyon	4,434		4,434	6,497	994,702	1.47	224	4,434		6,497		994,702		
Sequoia	11,805		11,805	12,395	1,578,256	1.05	134	11,805		12,395		1,578,256		
Subtotals-Calif.	66,070	17,491	83,561	107,263	14,488,218	1.62	219	83,421	140	107,208	55	14,473,241	14,977	
Totals -	66,476	20,717	87,193	107,675	14,618,380	1.62	220	87,053	140	107,620	55	14,603,403	14,977	
Reeradication Work														
Crater Lake	350		350	81	13,430	0.23	38	350		81		13,430		795
Lassen Volcanic	3,055		3,055	1,567	124,443	0.51	41	3,040	15	1,561	6	123,705	738	2,334
Yosemite**	18,801		18,801	23,320	2,923,524	1.24	155	18,801		23,320		2,923,524		4,297
Kings Canyon	2,601		2,601	1,978	213,233	0.76	82	2,601		1,978		213,233		
Sequoia	963		963	254	8,202	0.26	9	963		254		8,202		2,270
Subtotals-Calif.	25,420		25,420	27,119	3,269,402	1.07	129	25,405	15	27,113	6	3,268,664	738	8,901
Totals -	25,770		25,770	27,200	3,282,832	1.06	127	25,755	15	27,194	6	3,282,094	738	9,696
All Workings														
Crater Lake	756	3,226	3,982	493	143,592	0.65	190	3,982		493		143,592		795
Lassen Volcanic	9,665	10,955	20,620	7,301	896,116	0.76	93	20,465	155	7,240	61	880,401	15,715	2,334
Yosemite	62,022	6,536	68,558	105,957	14,067,111	1.71	227	68,558		105,957		14,067,111		4,297
Kings Canyon	7,035		7,035	8,475	1,207,935	1.20	172	7,035		8,475		1,207,935		
Sequoia	12,768		12,768	12,649	1,586,458	0.99	124	12,768		12,649		1,586,458		2,270
Subtotals-Calif.	91,490	17,491	108,981	134,382	17,757,620	1.47	194	108,826	155	134,321	61	17,741,905	15,715	8,901
Totals -	92,246	20,717	112,963	134,875	17,901,212	1.46	194	112,808	155	134,814	61	17,885,497	15,715	9,696

*In addition 8,206 acres, 5,577 man days, and 1,711,851 ribes on lands worked by the Forest Service and the Bureau of Entomology and Plant Quarantine are now in Yosemite National Park.

**In addition 480 acres, 326 man days, and 298,657 ribes on lands worked by the Bureau of Entomology and Plant Quarantine are now in Yosemite National Park.

***Includes work done by the Park Service on lands of all ownership.

TABLE 3

THE STATUS OF RIBES ERADICATION IN THE NATIONAL PARKS OF THE PACIFIC COAST REGION BY PRIORITY CLASSES AS OF DECEMBER 31, 1945

National Park	Total All Classes Acres	CLASS A				CLASS B				CLASS C	
		Total Acres	Un-worked Acres	Initial Working Acres	Reerad-ication Acres	Total Acres	Un-worked Acres	Initial Working Acres	Re-erad. Acres	Total Acres	Un-worked Acres
Yosemite	146,300	77,400	23,119	54,281	18,951	34,600	30,918	3,682	330	34,300	34,300
Sequoia	99,900	21,100	9,295	11,805	963	50,600	50,600	-	-	28,200	28,200
Kings Canyon	22,430	18,430	13,996	4,434	2,601	4,000	4,000	-	-	-	-
Lassen	17,932	11,563	367*	11,196	1,979	6,369	-	6,369	1,076	-	-
Crater	3,782	3,782	150	3,632	350	-	-	-	-	-	-
Grand Totals	290,344	132,275	46,927	85,348	24,844	95,569	85,518	10,051	1,406	62,500	62,500

*Actually no unworked acres exist; this discrepancy results from the original estimate of 17,932 acres in control units having been 367 acres larger than the actual acreage. When the next periodic revision of master tables is made the error will be corrected.

TABLE 4

SUMMARY OF CHECKING ON THE NATIONAL PARK SERVICE PROJECT - 1945

Operation	Regular Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Lassen Volcanic	60	5.0	2	2,015	4.5	41	2,075	4.6	43
Yosemite	3,923	5.0	86	3,840	2.3	49	7,763	3.7	135
Sequoia-Kings Canyon	3,777	5.0	83	1,381	4.9	34	5,158	5.0	117
Totals	7,760	5.0	171	7,236	3.4	124	14,996	4.2	295

TABLE 5
(Omnibus Table B, Sheet 2)

STATUS OF RIBES ERADICATION ON NATIONAL PARK LANDS, DECEMBER 31, 1945
PACIFIC COAST REGION

National Park Lands	Total Acres		First Working		Second Working	Other Workings	On Maintenance		Remaining Work	
	White Pine	Control Area	Acres	Per Cent	Acres	Acres	Acres	Per Cent	Unworked Acres	Requiring Rework Acres
Lassen Volcanic*	17,792	17,792	17,425	100	3,040				367	
Yosemite	143,790	143,790	57,963	40	17,972	1,309			85,827	
Kings Canyon	22,430	22,430	4,434	20	2,601				17,996	
Sequoia	99,900	99,900	11,805	12	963				88,095	
California Totals	283,912	283,912	91,627	32	24,576	1,309	30,360	11	192,285	61,267
Crater Lake	3,782	3,782	3,632	96	350		2,829	75	150	803
Totals	287,694	287,694	95,259	33	24,926	1,309	33,189	12	192,435	62,070

*All initial work completed.

PART VI

BLISTER RUST CONTROL BY THE OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION

Financial Project BLR-6

By

Lyle N. Anderson, Agent, P-2

PURPOSE

This project has been established to protect from white pine blister rust those white pine stands growing on the lands managed by the Oregon and California Revested Lands Administration of the United States Department of the Interior. Since these lands are in Oregon, the project is confined to that state.

ORGANIZATION AND LOCATION OF CONTROL WORK

The cooperative agreement between the Bureau and the O and C Revested Lands Administration, in force since 1941, was continued during 1945. Technical supervision of the field work and checking was handled by Bureau personnel. Mr. Floyd W. Scott, district forester of the O and C Administration at Medford supervised the camp management and supply problems. Policies, the over-all planning of the field work, and the recruitment of labor were the responsibility of the Portland office of the O and C Administration.

Two camps were operated in the Swede Basin area of the Siskiyou National Forest: one at Spaulding Mill on Horse Creek and the other at the Swede Basin mill site on Swede Creek.

WORK PERFORMED AND RESULTS ACCOMPLISHED

Ribes Eradication

A training school for supervisory personnel of the Oregon operation was held at the Spaulding Mill camp just prior to the reporting of the eradication crews. Ribes eradication practices and procedures, safety, camp management, sanitation, and personnel problems were discussed during the training session.

Fifty high school boys were assigned to each camp and eradication training started on June 4. The Spaulding Mill group continued with the eradication of ribes from the area recently planted to sugar pine. On August 5 the boys still remaining in the Spaulding Mill camp were transferred to Swede Basin and 50 Mexican Nationals were moved in. Numerous fires from then until the camp disbanded on September 15 limited the time spent on ribes eradication to a few days. The Mexicans showed promise of becoming very effective forest workers. The crews from the Swede Basin camp spent most of the season on initial treatment in an area of numerous

large ribes and dense brush cover. The work was severely disrupted by the numerous forest fires in the vicinity. The two camps spent 589 man days fighting fire.

The eradication results are summarized in Table 1.

Checking

The methods used in checking areas were the same as those employed in previous years. In Table 3 the checking accomplishments for the season are shown. Areas within a section blocked out as ribes free by the advance or post check were again covered when the regular check on crew work was made. By this method many scattered bushes that would otherwise remain for a future eradication to destroy can be picked up in one season with little additional work. A total of 1,803 acres were found to be ribes free.

FUNDS EXPENDED

Regular funds expended by the O and C Administration for eradication and checking for the calendar year of 1945 were $59,510.

RECOMMENDATIONS FOR FUTURE WORK

It is recommended that two camps again be assigned to the Swede Basin area of the Siskiyou National Forest to complete that project. If funds are available two additional camps could be used to continue initial eradication work in the Beaver Creek-Little Chinquapin Mt. section of the Pinehurst area south of the Rogue River National Forest. Post checking is badly needed on several areas, principally on the Selma and Pickett Creek units of the Siskiyou National Forest. As soon as competent men are available it should be undertaken.

The practice of working those areas most subject to damage from blister rust should be continued. Future work plans should be flexible enough to permit the immediate treatment of any area where blister rust damage is discovered.

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION IN 1945*

Control Operation	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status												Acres Ribes-Free At Re-eradication
								Acres Covered				8-Hour Man Days				Ribes Eradicated				
								Federal				Federal				Federal				
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	
Initial Work																				
Siskiyou N. F.	636	609	1,245	1,474	77,416	2.32	122	925	320	1,245		854	620	1,474		45,190	32,226	77,416		
Reeradication Work																				
Siskiyou N. F.	1,712		1,712	1,630	35,578	0.95	21	404	1,028	1,432	280	852	676	1,528	102	24,193	10,756	34,949	629	1,194
All Workings																				
Totals -	2,348	609	2,957	3,104	112,994	1.32	48	1,329	1,348	2,677	280	1,706	1,296	3,002	102	69,383	42,982	112,365	629	1,194

*Includes work done by the Oregon & California Revested Lands Administration on lands of all ownership.

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION 1940-1945*

Control Operation	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status												Acres Ribes-Free At Re-eradication
								Acres Covered				8-Hour Man Days				Ribes Eradicated				
								Federal				Federal				Federal				
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	National Forest	O & C	Total	Private	
Initial Work																				
Rogue River N. F.	2,849	1,095	3,944	2,282	179,659	0.80	63		1,384	1,384	2,560		1,053	1,053	1,229		78,612	78,612	101,047	
Siskiyou N. F.	7,792	14,724	22,516	7,735	519,003	0.99	67	9,671	11,463	21,134	1,382	3,120	4,304	7,424	311	207,701	297,528	505,229	13,774	
Siuslaw N. F. Nursery Sanitation	150		150	273	8,339	1.82	56		110	110	40		162	162	111		5,462	5,462	2,877	
Totals -	10,791	15,819	26,610	10,290	707,001	0.95	66	9,671	12,957	22,628	3,982	3,120	5,519	8,639	1,651	207,701	381,602	589,303	117,698	
Reeradication Work																				
Siskiyou N. F.	1,838		1,838	1,683	39,627	0.92	22	440	1,118	1,558	280	883	698	1,581	102	27,007	11,991	38,998	629	1,194
All Workings																				
Rogue River N. F.	2,849	1,095	3,944	2,282	179,659	0.80	63		1,384	1,384	2,560		1,053	1,053	1,229		78,612	78,612	101,047	
Siskiyou N. F.	9,630	14,724	24,354	9,418	558,630	0.98	58	10,111	12,581	22,692	1,662	4,003	5,002	9,005	413	234,708	309,519	544,227	14,403	1,194
Siuslaw N. F. Nursery Sanitation	150		150	273	8,339	1.82	56		110	110	40		162	162	111		5,462	5,462	2,877	
Totals -	12,629	15,819	28,448	11,973	746,628	0.95	59	10,111	14,075	24,186	4,262	4,003	6,217	10,220	1,753	234,708	393,593	628,301	118,327	1,194

*Includes work done by the Oregon & California Revested Lands Administration on lands of all ownership.

TABLE 3

SUMMARY OF CHECKING ON THE O & C PROJECT - 1945

Operation	Regular Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days	Acres Covered	Per Cent Of Check	Man Days
Siskiyou	3,470	5.0	64.5	4,337	4.7	76.5	7,807	4.8	141

TABLE 4

ACREAGE OF O & C LANDS WORKED BY ALL AGENCIES IN 1945
PACIFIC COAST REGION

Control Operation	First Working Acres	Second Working Acres	Other Workings Acres	All Workings Acres
Siskiyou	1,232	1,028	-	2,260
Klamath	651		-	651
Totals	1,883	1,028	-	2,911

TABLE 5

ACREAGE OF O & C LANDS WORKED BY ALL AGENCIES AS OF DECEMBER 31, 1945
PACIFIC COAST REGION

Control Operation	First Working Acres	Second Working Acres	Other Workings Acres	Total Workings Acres
Rogue River	6,778	-	-	6,778
Siskiyou	33,120	1,118	-	34,238
Klamath	651	-	-	651
McKinley Nursery (Siuslaw N.F.)	110	-	-	110
Totals	40,659	1,118	-	41,777

PART VII

SCOUTING AND DISEASE SURVEY

By

Douglas R. Miller, Forester, P-3

Scouting for white pine blister rust, Cronartium ribicola, in the Pacific Coast Region was continued during the 1945 season. The aim of the program was the same as that of preceding years, namely: first, to ascertain whether or not a long-distance spread of the rust had occurred from aeciospores produced in the north; secondly, to determine the amount of intensification of the disease on pine at those areas previously infected; thirdly, to retard the development of the rust as much as possible by eliminating all cankers located; and fourthly, to collect information on those sites harboring conditions highly favorable to the incidence and development of the rust so that the urgency of each area's need of ribes eradication can be determined.

The status of the known spread of blister rust at the beginning of the 1945 scouting season and a short history of its spread in the Pacific Coast Region follows:

Oregon

Blister rust was discovered in northwestern Oregon during the summer of 1925. Since then, it has spread southward throughout the western white and sugar pine stands of both the Coast and Cascade Ranges. In southern Oregon at locations favorable to rust development it is not uncommon to find the disease generally present on five-needled pines.

California

Blister rust on both ribes and pines was discovered in California during 1936. At that time, the disease was confined to a narrow belt lying just south of the Oregon line on the Klamath National Forest. Weather conditions during the spring of 1937 and 1938 were favorable to aeciospore dissemination as well as to ribes infection, and the rust made a long-distance spread into both the Coast Range and Sierra Nevada Mountains. By the end of the 1944 season, many blister rust cankers on sugar pine had been found on the southern end of the Plumas National Forest a distance of about 165 miles south of the Oregon line. Infected ribes had been found along the coast at a point 265 miles south of the Oregon line as well as on the southern Eldorado National Forest which is about 240 miles south of the boundary.

Table 1 presents by years the known southward spread of the rust measured in miles from the Oregon line and gives the generic host involved for each of the two sugar pine areas in California.

TABLE 1

ANNUAL SPREAD SOUTHWARD OF BLISTER RUST IN CALIFORNIA

Area	Infected Host	Spread in Miles from Oregon Border									
		1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
Sierra Nevada	Sugar Pine					107	165	165	165	165	165
	Ribes		120	160	160	160	160	160	175	240	240
Coast Range	Sugar Pine	4	4	4	14	42	42	42	115	115	115
	Ribes	6	125	125	125	125	200	210	265	265	265

ORGANIZATION AND METHODS OF WORK

The scouting force, during the active ribes eradication season, consisted of a small crew working part time on the Rogue River National Forest. In late August and early September, members of the Bureau's staff as well as a few seasonal employees were organized into scouting parties. These varied in size from two to ten men and the last crew discontinued work October 10. In addition members of the Division of Forest Pathology and of the blister rust personnel of all agencies on the various operations both in Oregon and California made observations while performing their regular duties.

The methods used in scouting and the mechanics of performing the work as well as recording the data were the same as those described in the 1942 Annual Report. Emphasis is still being placed on locating areas which support conditions favorable to the establishment and development of the rust. The practice of pruning all pines examined and of removing cankers found was continued.

WORK PERFORMED AND RESULTS OBTAINED

The eighth annual survey of the charts of upper air currents and other meteorological records covering the Pacific Coast for the spring months of 1945 was made by Drs. W. W. Wagener and J. W. Kimmey of the Division of Forest Pathology. They state in part:

> "Judged on the basis of direction, velocity and continuity, as indicated on the upper air charts, winds rated as fair or good for the transport of spores into California this spring occurred as follows:
>
> April 1 - 2 good
> April 8 - 9 fair
> April 12 - 17 fair to good
> April 21 - 23 fair to good
> May 30 - 31 fair
> June 10 - 11 fair to good
> June 13 - 15 mostly good
> June 25 - 30 fair to good
>
> "This is a larger number of favorable periods than we have noted in any previous year. Sporulation from pine cankers in northern Oregon ordinarily reaches its peak during the first half of April but this is before many of the ribes, the alternate hosts for the rust, have leafed out in the upper levels of the sugar pine belt in the Sierras, except on south exposures or in other exposed situations. On the other hand, by the time of the June periods of favorable winds, sporulation of the pine cankers would have

almost entirely ceased except for infected trees at higher elevations. Accordingly their effect as probable rust carriers can be discounted.

"Establishment of the rust on ribes in new areas requires not only spores from which the new infections can start but also moisture to permit the germination of the spores and the penetration of the germ tubes into the leaves of the host. Weather Bureau precipitation records for Sierra Nevada and north Coast Range stations show fairly heavy rains on April 8, with lighter following showers on several succeeding days at some stations. Light rains also occurred at many northern California stations on April 25 or 26. These two periods should have provided the necessary moisture for infection by any spores blown into the State during the favorable wind periods in April. However, the rains on April 8 were so heavy that they would tend to wash many of the aeciospores that might have lodged there off of the leaves. May was an unusually rainy month in the mountains, offering good conditions for the intensification of any rust that may have become established in April. In June general rains occurred in the Sierras between the 2nd and 7th, for the most part about June 4. There were also scattered rains and thunder showers, heavy in places, between June 22 and 25. Moisture conditions for rust establishment were accordingly more favorable this spring as a whole than for an average season.

"Because of the combination of periods of northerly winds in April and June, followed by rains within a sufficient time to permit infection or to provide for later intensification, the chances appear to have been good this spring for the establishment of blister rust at new locations from spores carried down from rust centers in the north."

Intensive scouting in the Sierras revealed that ribes infected with blister rust, with a few exceptions, occurred only in the vicinity of sporulating cankers. Even in northern California and southern Oregon where sporulating cankers are rather common only a few infected bushes were found that were more than 20 chains from diseased pines. Scouting also showed that, although numerous rains occurred during the late spring and early summer, the intensification of the rust on ribes leaves was exceedingly light when compared with that of 1944. The rust, on nearly every bush that was at a distance of 20 chains or more from a sporulating canker, was confined to one or two leaves. This light intensity of the disease on ribes, with one exception, was general even on the western portion of the Klamath National Forest where the rust has been making almost unprecedented intensification each year. Bushes of Ribes sanguineum (this species is highly susceptible and appears to intensify the rust to a greater extent than any other wild species of ribes) could be found growing beneath sugar pine trees which had sporulating cankers and yet their leaves would be free of the disease.

The lack of a general spread of the rust during the spring is attributed to the lateness of the spring season coupled with the exceptionally heavy and continuous rains that occurred in May. By far the greatest majority of the sporulating cankers in southern Oregon and northern California occur

on the north-facing slopes at the higher elevations (4000-5000 feet) and these did not reach the peak of sporulation until about mid-May. As a result of their lateness of maturing and the unusual amount of precipitation a high percentage of the aeciospores was germinated in the aecial pustules while others were washed out of the air or off the ribes to the ground. Since rains, varying in amounts from light showers to heavy down-pours, occurred nearly every day from early May to June 6, the aeciospores were kept pretty well out of the air. Hence a long-distance spread, of any intensity, of the rust was unlikely to have occurred. However, on the Modoc, Tahoe, and Eldorado National Forests where no infected pines have been found, there was some evidence of a long-distance spread of the rust. One specimen of Cronartium on ribes from both the Modoc and Tahoe National Forests and two specimens from the Eldorado National Forest were identified as blister rust. Numerous samples of Cronartium on ribes leaves collected from the Sierra, Stanislaus, and Eldorado National Forests were sent in for determination. Several of these showed a weak blister rust reaction when tested. Positive identification could not be made on this latter group of rust specimens, but since they came from the pinyon country it is believed they are all pinyon rust. No trouble was experienced with the identification of the specimens collected in northern California and southern Oregon.

During the 1945 scouting season blister rust was found at three new centers and in addition cankers on sugar pine were found at the Shovel Creek and Indian Creek infection centers on the Shasta National Forest for the first time. One fair sized infection center of 1938 origin was located along Dogwood Creek in section 18, T. 23 N., R. 5 E., near the southern boundary of the Lassen National Forest. Numerous bushes of Ribes roezli (between 200 and 300 per acre) were growing on the stream banks and bushes of R. nevadense were common. Since young sugar pine trees were fairly common (392 were examined in the vicinity of the infection center) there was excellent host association. The 23 infected sugar pines supporting 5 stem and 239 limb cankers were confined to a 7 or 8 chain segment of the stream valley. This center was situated from one to a few miles distant from other blister rust centers on sugar pine that had been found previously in this general area. Although 23 trees were infected with a total of 244 cankers it was light in rust intensity when compared with centers of the same age found either on the Klamath National Forest or in southern Oregon.

Another pine infection center was found along the East Branch of Rock Creek in section 32, T. 24 N., R. 9 E., in the Meadow Valley unit on the Plumas National Forest. Only two infected sugar pine trees with one limb canker each were involved. Both cankers had sporulated during the last year or two but the limb beyond each canker had flagged and died. The cankers were probably of 1938 origin. A few lightly infected bushes of R. roezli were found near the diseased pines. The rust at this infection center had failed to make any intensification on sugar pine since the initial infection.

Infected sugar pines with sporulating cankers were located for the first time at the Indian Creek center in section 3, T. 37 N., R. 1 E., on the southern end of the Shasta National Forest. There were 17 trees with 78 cankers found; lack of time prevented a thorough coverage of the center. The oldest cankers were of 1938 origin. Although ribes bushes and sugar pine trees were common associates, the rust failed to show a very heavy intensification on pines.

One sugar pine with two non-sporulating cankers (of about 1943 origin) was located at the Shovel Creek center in section 3, T. 47 N., R. 3 W. on the northern end of the Shasta National Forest. This is one of the two known locations in California that support bushes of Ribes petiolare. Several bushes of this species as well as a few bushes of R. sanguineum were rusted. Sugar pines are rather scarce on the area. Since numerous infected ribes bushes were located, there is undoubtedly one or more sporulating cankers along the stream. Lack of time prevented a thorough coverage of the ribes and pines growing at this site.

The one new infection center that extended the known range of the rust was located beside Silver Creek in section 15, T. 38 N., R. 16 E. in the southeast corner of the Modoc National Forest. Bushes of R. petiolare and R. inerme are abundant beside the stream, while western white and white bark pine are common around and above Lost Lake but decrease in number down Silver Creek. The infection on the one rusted leaf of R. petiolare was sent in for determination and proved to be Cronartium ribicola. This discovery extended the known range of blister rust about 100 miles eastward in northern California. Also it is the first time the disease has been found in either the Modoc National Forest or Lassen County. The Silver Creek area appears to be an excellent site for the incidence and development of the rust except for its altitude, which is between 6500 and 7000 feet above sea level. Once the rust becomes established on pines, altitude will no longer be a hindrance to the rust's development. The ribes and pines on this area should be watched closely to determine whether or not any pine infection occurred during the fall of 1945.

There was one area on the Klamath National Forest where the blister rust did intensify on the leaves of R. sanguineum to about the same extent as it did in 1944. This area is in the vicinity of Slater Butte which lies between the Indian and Thompson Creek drainages. The bushes of this species were again so heavily infected that their leaves would crinkle exposing portions of the brownish colored upper surfaces and the telial covered under surfaces which gave the entire foliage a golden appearance. Bushes rusted to this extent could easily be spotted while driving along the road. One small spot at "One Hundred Dollar Camp" had hundreds of bushes of R. sanguineum covered with rust. These heavily rusted leaves continued to cling to the branches even after the first frosts. This is one of the reasons why R. sanguineum is so damaging to the surrounding pines.

The infection center along the East Fork of Indian Creek on the western part of the Klamath National Forest was examined again in 1945. A complete history of this center can be found on pages 89-90 of the 1942 Annual Report. Most of the R. bracteosum bushes growing along the stream were heavily rusted. Young sugar pine trees, though always generally few in number along the creek, are becoming almost rare as the rust is steadily killing those nearest the ribes. The pole-size trees have numerous "flags" even on the hillside ten or more chains above the stream. Young trees up to 15 feet in height within this distance of the stream are either dead or dying.

There is one tree of interest at the heaviest part of this center. Trees nearby had numerous cankers when examined in 1942 and two had over 1000 each, but this tree appeared to be free of the disease. It had no cankers

when examined this year although it is fifty feet or less from bushes of Ribes bracteosum. The sugar pine has a thrifty crown and is about 20 feet tall.

In 1942 thousands of cankers of 1941 origin were found on the trees in this area, and although rust intensification last year on ribes leaves was the heaviest ever noted, only two cankers of 1944 origin were found this year. These two cankers were of interest as they were the only ones of last year's origin found during the scouting season. This might be an indication that conditions necessary for the spread of the rust from ribes to pines were poor during the fall of 1944. On the other hand, canker development of that year could have been generally poor with but very few visible during the fall of 1945. The 1946 scouting season should settle this question.

The ribes infection centers in southern Mendocino County were examined again. These centers are near the coast and are entirely out of the sugar pine belt. The areas were last inspected in 1943 and at that time only a few bushes were infected, but these showed some evidence of the rust having overwintered. There were many more bushes infected this season even though apparently this was a poor year for long-distance spread, which indicates that the rust might be overwintering and building up from year to year. Few telia are produced at these sites; however, enough were found for identification and every sample proved to be blister rust.

The infection center on the headwaters of the Hayfork River on the Trinity National Forest was again visited. Ten more infected trees were found and removed. Although ribes bushes are fairly numerous in the vicinity only four bushes of R. nevadense were found rusted and these lightly so. Since this is the southernmost pine center that has been found in the Coast Range an effort was made to stamp out the rust. Every sugar pine tree 20 feet or less in height within the infection zone was removed regardless of whether cankers were found on its limbs or stem. The only other rust found on this forest was on ribes on the north facing slope of South Fork Mountain near Forest Glen. One lightly infected ribes bush at each of three locations was the extent of the disease in this area. Since R. bracteosum along the streams and R. sanguineum are common on this slope the area should be watched closely as the rust can build up rapidly with these hosts present.

The pinyon rust made a normal spread over much of its customary range. It was absent or nearly so north of the Tahoe National Forest and reached its peak of intensification on the southern Eldorado and northern Stanislaus National Forests. From here it decreased in intensity as progress was made southward until it again became absent or nearly so on the northern end of the Sequoia National Forest. Pinyon rust like blister rust was much lighter in its intensity on ribes this year than it was during 1944.

A summarization by forests and parks of the number of white pines and ribes examined as well as the number of each host found to be infected is presented in Table 2. The examination of ribes bushes for blister rust constituted most of the work performed by the scouts. Numerous pines, however, were examined in the outer zones of infection, but there were not enough man days available to concentrate on the removal of cankers at the heavy pine infection centers in southern Oregon and northern California. Of the 13,590 white pines examined 1,531 were infected with 39,453 cankers.

SUMMARY

Scouting during 1945 revealed a few new blister rust infection centers. Also, additional observations were made on the rust's behavior. A resumé of the results of the scouting season follows:

1. There was no general long-distance spread of the rust in California from aeciospores produced at northern sources, although four rusted ribes were located beyond the outer zone of cankerous pines.

2. Heavy rains at the source of spores during and immediately following sporulation confined practically all of the ribes infection to those bushes near the infected pines. Climatic conditions during the summer were generally unfavorable for intensifying the rust on the leaves of ribes bushes.

3. Pinyon rust on ribes was less general than in 1944. It was almost absent north of the Tahoe National Forest and south of the Sierra National Forest.

4. The blister rust infection zone was extended eastward for a distance of about 100 miles in northern California. This find put the rust on the Modoc National Forest for the first time.

5. The intensification of the rust at pine centers in the Sierras is extremely light when compared with that made at similar centers on the Klamath National Forest.

6. Bushes of Ribes sanguineum, because of their general distribution, habitat, and inherent characteristics, appear to be by far the most rust-hazardous species of all wild ribes occurring within the Pacific Coast Region.

7. Although rust intensification on ribes leaves during 1944 was the heaviest ever noted, only two cankers of 1944 origin were found in 1945.

8. All found cankers other than those at the heavy pine centers on the Klamath National Forest were removed upon discovery, and many at the former locations were also eliminated. During the summer 39,453 cankers were removed from 1,531 diseased pines.

TABLE 2

SCOUTING RESULTS FOR THE PACIFIC COAST REGION - 1945

National Forest or Area	Ribes				White Pines				
		*Infected With					Cankers		
	Examined	BR	PR	Total	Examined	Infected	Stem	Limb	Total
Oregon									
Crater Lake Nat'l Park	540				160				
Rogue River	1,440	159		159	3,689	809	285	4,893	5,178
Siskiyou	630	120		120	772	119	155	2,903	3,058
Klamath	620	73		73	200	6	3	23	26
Total for Oregon	3,230	352		352	4,821	934	443	7,819	8,262
California									
Siskiyou	163	51		51	78	59	95	7,690	7,785
Klamath	741	331		331	1,379	427	437	22,490	22,927
Trinity	611	7		7	169	10	2	39	41
Mendocino	689				103				
Coastal	275	47		47	10				
Shasta	808	154		154	235	28	7	112	119
Modoc	620	1		1	120				
Lassen Volcanic Nat'l Park	300	14	2	16	9				
Lassen	2,720	174		174	2,469	35	10	253	263
Plumas	3,633	22	3	25	3,110	38	2	54	56
Tahoe	816	1	10	11	148				
Eldorado	2,292	2	153	155	217				
Stanislaus	1,186		135	135	87				
Yosemite	1,110		10	10	85				
Sierra	1,765		31	31	550				
Sequoia	320		1	1					
Total for California	18,054	804	345	1,149	8,769	597	553	30,638	31,191
Total Pacific Coast Region	21,284	1,156	345	1,501	13,590	1,531	996	38,457	39,453

*BR = Blister Rust
PR = Pinyon Rust

ANNUAL REPORT - 1945

RIBES ECOLOGY AND DEVELOPMENTAL WORK

IN METHODS OF RIBES ERADICATION

BY THE

BERKELEY OFFICE

Work Project BLR-1-6

PART VIII

RIBES ECOLOGY AND DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION IN THE PACIFIC COAST REGION, 1945

By

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and H. R. Offord, Pathologist

FOREWORD

Methods development and ribes ecology work in the Pacific Coast Region during 1945 included maintenance of ecology plots, checking of chemical tests initiated in 1944, and new tests on the herbicidal effectiveness of 2,4-dichlorophenoxyacetic acid (2,4-D) and ammonium sulfamate.

Results of 2,4-D on R. roezli are encouraging. This ribes species is apparently highly susceptible to 2,4-D Final results of the 1945 plots will not be available until the early summer of 1946 but in view of previous favorable results on greenhouse plants, it is believed that 2,4-D will be fully effective on R. roezli. Treatments will probably have to be made during the season of active vegetative growth.

Encouraging results can also be reported from the tests with ammonium sulfamate. Under specified conditions ammonium sulfamate (du Pont's Ammate) may be considered for practical eradication work with excellent prospects of success on R. bracteosum, R. erythrocarpum, R. inerme, and R. lacustre. R. binominatum and R. tularense also appear to be susceptible to sulfamate.

The major portion of L. P. Winslow's time during the field season was again devoted to operations work in southern Oregon and the Klamath National Forest. Mr. Winslow was detailed to the California Forest and Range Experiment Station from September 17 to December 1 to assist in the experimental eradication of brush along trails, firebreaks, and roads. In this work, covering territory from the Klamath N.F. to the San Bernardino N.F., some 265 square rod plots were treated with aqueous 2,4-D and ammonium sulfamate in several dosages by a power spray rig.

Highlights from ribes ecology studies in 1945 are as follows. On the Cow Creek 10-acre fenced plot, vigor of snowbrush on small areas has declined sufficiently to permit occurrence and persistence of some seedling-origin gooseberries. It is doubtful, however, that any of these ribes will persist to fruiting size and vigor. Many of the larger gooseberry bushes on this Cow Creek plot were severely damaged by mice during the winter of 1944-45. This is the first time that such damage in any appreciable amount, has been observed by the writer. Counts of ribes current-season seedlings in 1945 were about 3/4 of the counts in 1944. The percentage of one-year survival of gooseberry seedlings for 1944-45 was approximately the same as for 1943-44. There has been practically no regeneration of ribes on the Blue Canyon one-acre plot, an area of excellent pole-size sugar pine reproduction, since the eradication of all known ribes in 1944. The 1945 inspection of the Signal Peak one-acre plot, situated in an area where ribes cannot be readily found, revealed a total of 119 ribes, 5 of which were fruiting.

Some 965 ribes were removed from the Shaver Timber one-acre plot in 1945. No current-season ribes seedlings were observed this year within the Chowchilla Mt. exclosure. For the second year, however, more fruiting bushes were found inside the fence than outside. All the ribes fruits produced on the burned portion of the Cow Creek 5.6-acre fenced plot were again consumed by rodents. In the past 8 years a total of 877 fruiting gooseberry bushes have been removed from an area of 1/40 acre (plot G) on Chowchilla Mt.

SECTION I. FIELD WORK IN METHODS OF RIBES ERADICATION FOR 1945

1. Results of 1944 Tests.

Examination of the Tee Creek plots, Klamath National Forest (R. bracteosum), and the Egbert Place plots, Plumas National Forest (R. inerme), showed that ammonium sulfamate was highly effective when applied as an aqueous spray and soil drence to these ribes. The action of sulfamate on R. roezli was again somewhat inconsistent. Apparently sulfamate is more effective in cool, moist soils than in warm dry soils. Results of these 1944 tests are given in table 1 and suggestions for the practical use of ammonium sulfamate are given in table 16.

2. Dosage Tests With Diesel Oil.

The results of dosage tests of Diesel oil and oil mixtures and the effect of various dosages on the regeneration of R. roezli were again recorded in 1945. Reference to table 2 shows that 1945 was a poor year for new seedlings on the oil treated plots. On the controls, however, more seedlings appeared this year than any year since 1940. No significant number of seedlings has appeared on any of the oil plots since 1942. Dosages of 3 gallons or more of oil have arrested all significant germination of seedlings since the plots were established in 1938.

3. Tests of New Herbicides in 1945.

Ammonium sulfamate was tested for the first time on R. binominatum and R. erythrocarpum (table 13), on R. tularense (table 14), on R. lacustre in Oregon (table 10), and on R. cruentum (table 12). At the end of the season results of the sulfamate treatments appeared to be excellent on R. binominatum, R. erythrocarpum, and R. tularense.

Principal chemical tests of the 1945 field season were those with 2,4-dichlorophenoxyacetic acid (2,4-D), the new growth-regulating substance now being used successfully as a weed-killer. Data given in tables 3 to 15 inclusive show that most of the ribes of economic importance in the Pacific Coast region were included in these field tests. In addition to testing various ribes species, objectives of these plots were related to dosage, concentration, formula of 2,4-D, spreaders and stickers, time of year to apply, and method of treatment. Final results from these plot tests will be available about June of 1946. Of the 16 Ribes species on which 2,4-D acid (or its analogs) has been tested, R. petiolare and R. roezli appear to be highly susceptible. R. cereum, R. cruentum, R. nevadense, R. sanguineum, and R. viscosissimum are moderately susceptible, and R. binominatum, R. erythrocarpum, R. glutinosum, R. inerme, R. lacustre, R. lobbii, R. menziesii, R. montigenum, and R. tularense are moderately to highly resistant.

Effective results with 2,4-D on susceptible Ribes are obtained only when the plants are making active vegetative growth. For R. petiolare and R. roezli, 100 percent kill of test plants has been obtained by spraying the aerial plant parts with the aqueous sodium salt of 2,4-D acid containing the equivalent of 500 p.p.m. (0.05%) of the 2,4-D acid. With the possible exception of a combination of 2,4-D (salt or acid) with furfural (originated in this project) resistant Ribes have been unaffected by the several 2,4-D formulae so far tested.

Preliminary field trials of power sprayers were made in California and Idaho for applying ammonium sulfamate and 2,4-D to Ribes. Indications are that these methods will lower the costs of establishing control on cut-over lands.

TABLE 1

RESULTS OF 1944 FIELD TESTS WITH AMMONIUM SULFAMATE IN CALIFORNIA
SPRAY AND SOIL DRENCH DOSAGE TESTS (MILACRE PLOTS)

Location and Plot Number	Date of Treatment	Pounds Chemical	Gals. Water	Ribes Species	Number of Sprouts or Live Bushes	Percent Kill 4/ Live Stem
Tee Creek, Klamath N.F.						
1	7/15/44	8	6	bracteosum	0	100
2	Do.	6	6	Do.	0	100
3	Do.	4	4	Do.	0	100
4	Do.	2	4	Do.	3	98
Egbert Place Plumas N.F.						
1	7/19/44	2	4	inerme	1	100
2	Do.	4	4	Do.	1	100
3	Do.	6	6	Do.	0	100
4	Do.	8	6	Do.	0	100
Mooreville Ridge, Plumas N.F.						
1	7/21/44	4	4	roezli	3	99
2 1/	Do.	4	4	Do.	0	100
Laurel Creek, Sierra N.F.						
1	7/28/44	4	4	roezli	1	100
2 2/	Do.	4	4	Do.	2	100
3 3/	Do.	4	4	Do.	3	100
Baldy Saddle, Sequoia N.F. 1	Bushes 1 to 34 varying in size from 25 to 600 FLS given crown drench with aqueous ammonium sulfamate (1 lb. per gal. water). Dosage varied from 1 qt. to 3 gals., depending on size of bush. Bush No. 35 (750 FLS) was sprayed on Aug. 2 with 2 gals. of solution.				9	95

1/ Treated with sulfamate spray to which was added 150 cc. of glycerine as a hygroscopic agent.

2/ 150 cc. of glycerine added to sulfamate solution.

3/ 500 cc. furfural (0.5%) + phenyl acetylene (0.01%) added to sulfamate solution.

4/ See 1944 annual report for data on original live stem and percent of plot area occupied by ribes.

TABLE 2

RESULTS OF 1938 DOSAGE TESTS OF NEW OIL MIXTURES ON SMALL RIBES ROEZLI BUSHES, CHOWCHILLA MT., SIERRA N.F., CALIFORNIA - SUMMARY OF DATA 1938-1945

Plot No.	Dosage in Gals. Per Milacre	Oil Mixture Used	1938 Number Bushes on Plot	1938 Percent Bushes Killed	Current Season Seedlings '39	'40	'41	'42	'43	'44	'45	Total 1939-45	Total Fruiting Bushes Removed 1939-45	Non-fruiting Bushes Over 1 Yr. Old, 1945 Check
28	0.5		195	90	15	13	8	7	-	5	-	48	12	1
1	1.0		43	93	-	-	-	-	-	-	-	-	2	-
2	1.5	SO_2	105	96	2	4	-	-	-	-	-	6	4	-
3	2.0	Extract	55	100	-	2	2	2	-	-	-	6	-	1
4	3.0		70	100	-	-	-	-	-	-	-	-	-	-
5	5.0		137	99	-	-	-	-	-	-	-	-	1	-
6	10.0		94	100	-	-	-	-	-	-	-	-	-	-
7	1.0		18	83	1	-	1	-	-	-	-	2	2	-
8	1.5		85	96	8	-	-	2	-	-	-	10	1	-
9	2.0	Diesel	76	93	4	-	4	-	-	1	-	9	3	1
10	3.0	Oil	56	100	-	-	-	-	-	-	-	-	-	-
11	5.0		59	100	-	-	-	-	-	-	-	-	-	-
12	10.0		35	100	-	-	-	-	-	-	-	-	-	-
13	1.0		58	71	54	26	15	18	-	-	-	113	8	7
14	1.5	Diesel	94	91	17	9	1	3	-	-	-	30	8	1
15	2.0	Oil	21	81	9	13	-	3	-	-	-	25	4	-
16	3.0	+	109	100	1	-	-	-	-	-	-	1	1	-
17	5.0	Crude	110	95	1	8	-	-	-	-	-	9	6	-
18	10.0	Oil	65	100	-	-	-	-	-	-	-	-	-	-
29	0.5		57	100	24	33	1	-	-	-	3	66	-	-
19	1.0	SO_2	77	92	93	46	2	3	-	-	3	147	9	3
20	1.5	Extract	210	94	22	14	-	-	-	-	1	37	14	4
21	2.0	+	23	96	7	36	-	-	-	2	-	45	-	2
22	3.0	Diesel	46	100	3	3	1	-	-	2	-	9	1	1
23	5.0	Oil	127	100	-	5	-	-	-	-	-	5	-	-
24	10.0		135	100	-	-	-	-	-	-	-	-	-	-
25	0.0		209	None	87	41	-	-	2	-	25	155	68	60
26	0.0	Control	25	None	137	96	1	3	-	-	3	240	26	2
27	0.0		170	None	81	15	7	-	-	8	35	146	90	43

TABLE 3

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D SPRING SERIES, SHAVER LAKE PLOTS, SIERRA NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
	Ribes roezli				
Peterson Mill 5/23					
1	2,4-D 70% Dow Na salt	1	5	450	70
2	1.43 oz. in 10 gals. water	2	5	400	75
3	No spreader	3	6	400	70
4		4	3	300	50
5	2,4-D 100% acid in 1%	1	5	250	40
6	Carbowax 1/	2	5	250	40
7	1.0 oz. in 10 gals. water	3	6	300	50
8	No spreader	4	5	250	40
P/T 2/	2,4-D 70% Na salt 1.43 oz. in 10 gals. water No spreader	10	180	-	-
	Ribes nevadense				
Swanson Camp 5/24					
1	2,4-D 100% acid in 1% Carbowax 3/ 1.0 oz. in 10 gals. water	1	1 N 3 R	500 75	60
2	+ Tergitol (1 tbsp.)	2	1 N 3 R	400 100	70
3		3	2 N 3 R	100 400	60
4		4	2 N 1 R	2000 100	100
P/T 4/	2,4-D 60% Dow Na salt 1.67 oz. in 6 gals. water + 4 tbsp. triethanolamine + Tergitol (1 tbsp.)	3	10 N 8 R	1600 400	90

1/ Carbowax dissolved in 1 gal. cold water 14° C. in about 2 hours. In series 5-8 about 600 p.p.m. 2,4-D dissolved, leaving residue which was dissolved in 1 gal. water made alkaline with NH_4OH. Staked R. roezli numbered 1-5 then sprayed with this dilute NH_4 salt of 2,4-D.

2/ Practical test in which only R. roezli were sprayed so as to give a complete top coverage plus a drench about the individual crown. About 180 R. roezli were treated in this practical test.

3/ Carbowax for this formula was dissolved earlier in 1 gal. warm water. This suspension subsequently dissolved more slowly than solid Carbowax added directly to cold water. Triethanolamine (8 tbsp.) was added to this Carbowax mixture and residue from this was dissolved in additional 4 tbsp. triethanolamine in 1 gal. water and applied as a crown drench to 4 R. roezli plants adjacent to road and to filling station.

4/ Six gals. soln. applied uniformly to plot area, about 2 milacres.

TABLE 4

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D, SUMMER SERIES[1/], PETERSON MILL PLOTS, SHAVER LAKE, SIERRA NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
Ribes roezli and Ribes nevadense					
8/23	2,4-D 100% acid in mixture 2 oz. furfural, 1.0 oz. acid in 6 gals. water 1/2 tbsp. Tergitol				
9		3	14 R	400	60
10		2	7 R	325	40
11		1	7 R 1 N	250 20	40
12	2,4-D 100% acid in mixture 2 oz. furfural, 1.0 oz. acid in 6 gals. water No spreader	2	8 R	500	60
13		3	7 R	500	70
14		1	8 R 1 N	450 10	60
15	2,4-D 100% acid in mixture 1% Carbowax 1.0 oz. acid in 6 gals. water No spreader	3	4 R	500	80
16		2	6 R 15 N	250 30	30
17		1	4 R 25 N	100 25	25

1/ One large R. nevadense adjacent to water course treated with crown drench of 5 pounds Ammate dissolved in 5 gals. water.

TABLE 5

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D, FALL SERIES[1/]
PETERSON MILL PLOTS, SHAVER LAKE, SIERRA NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
Ribes roezli and Ribes nevadense					
9/27					
A	2,4-D 60% Dow Na salt 1.67 oz. in 6 gals. water + Tergitol (1 tbsp.)	1	5 R 30 N	30 75	25
B		2	25 R 20 N	75 25	30
C		3	3 R * N	15 -	- -
G		1	12 R	210	15
H		2	7 R	840	70
I		3	* R	900	95
D	2,4-D 60% Dow Na salt + furfural (3 tbsp.) 1.67 oz. salt in 6 gals. water + Tergitol (1 tbsp.)	1	10 R 16 N	160 80	60
E		2	11 R 4 N	315 40	65
F		3	13 R 8 N	265 15	65
J	2,4-D 60% Dow Na salt + furfural (3 tbsp.) 1.67 oz. salt in 6 gals. water + Tergitol (1 tbsp.)	1	14 R	310	60
K		2	5 R	430	70
L		3	3 R	680	70

1/ In addition to above spray plots, 5 special groups of ribes were treated by applying to the soil dry 2,4-D 60%, Dow Na salt (in dosages of level tablespoonful as indicated by number after the letter, i.e., M2, N4, O6, P8, and Q10). These plots treated by mixing dosage of dry 2,4-D with about 2-3 pints dry soil and spreading this mixture over the milacre area.

*Bushes small and numerous. In case of R. nevadense the plants were grazed heavily.

TABLE 6

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D ON RIBES ROEZLI AND R. CEREUM, WILSON LAKE PLOTS, LASSEN NATIONAL FOREST, CALIF.

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
7/13					
1	2,4-D 100% acid + sodium carbonate 1.43 oz. of mixture in 10 gals. water contained 1.0 oz. acid + Tergitol #7 (1 tbsp.)	2	15 R	400	75
2		3	10 R	375	80
3		4	12 R	350	90
4		1	14 R	300	65
5 1/	2,4-D 60% Dow Na salt 1.66 of salt in 6 gals. water No spreader added.	1 1/4	40	2800	-
6	2,4-D 100% acid in 1% Carbowax 1.0 oz. acid in 10 gals. water + triethanolamine (2 tbsp.)	1	9 R	350	85
7		2	7 R	600	100
8		4	6 R 1 C	500 200	100
9		3	8 R 1 C	350 125	70
10 2/	2,4-D 100% acid 1.0 oz. in 5 gals. water + triethanolamine (2 tbsp.)	1 2/	40 R 1 C	4000 300	40

1/ A practical spray test over a plot area of about 4 milacres. Dosage rate estimated as 1 1/4 gals. per milacre.

2/ A practical spray test on a plot area of about 10 milacres. Dosage rate about 1 gal. per milacre.

TABLE 7

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D ON RIBES ROEZLI[1/], SOUTH RUBICON PLOTS, ELDORADO NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
8/21					
1	2,4-D 100% acid in 1% Carbowax	3	4	450	90
2	1.0 oz. acid in 6 gals. water (Mix. supplied by	2	8	400	85
4	Washington, D. C.) and contained about 800 p.p.m. acid)	1	7	400	75
3	2,4-D 60% Dow Na salt	3	8	500	75
7	1.67 oz. salt in 6 gals.	1	3	300	75
8	water + Tergitol #7 (1 tbsp.)	2	5	450	90
	2,4-D 60% Dow Na salt				
5	1.67 oz. salt in 6 gals.	2	5	400	75
6	water + furfural (2 tbsp.)	1	2	250	75
9	+ Tergitol #7 (1 tbsp.)	3	4	450	85

[1/] Bushes in ripe fruit stage heavily loaded with berries. Vegetative growth about finished for season. Soil moist and with firm grassy sod in places. Soil largely granitic and adjacent site excellent for sugar pine. Plots located adjacent to stream in South Ribicon Public Camp Ground.

TABLE 8

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D ON RIBES INERME, BATTLE MEADOW PLOTS, LASSEN NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
7/12					
1	2,4-D 100% acid + sodium carbonate	1	7	200	30
2	1.43 oz. of mixture in 10 gals. water contained	3	8	400	60
3	1.0 oz. acid	4	8	400	70
4	No spreader	2	10	350	60
5[1/]	2,4-D 60% Dow Na salt 1.66 oz. salt in 6 gals. water No spreader	2	20	2000	80

[1/] Practical spray test ribes only treated by spray and crown drench. Plot 5-sided and covers about 2.7 milacres.

TABLE 9

1945 TESTS OF 2,4-D AND AMMATE ON RIBES ROEZLI, MOOREVILLE RIDGE PLOTS, PLUMAS NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Chemical Used and Concentration	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
7/23					
1	2,4-D 70% Dow Na salt	1	4	375	50
2	1.43 oz. in 6 gals. water	2	5	325	40
3	+ Tergitol #7 (1 tsp.)	3	8	400	50
Bush No.		Pints			
1	Ammate 1 lb. per gal. water	1	1	-	-
2	Do.	3	1	-	-
3	Do.	4	1	-	-
4	Do.	2	1	-	-
5	Do.	3	1	-	-
6	Do.	8	1	-	-
7	Do.	2	1	-	-
8	Do.	2	1	-	-
9	Do.	2	1	-	-

TABLE 10

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D ON RIBES LACUSTRE, LONG JOHN CREEK PLOTS, KLAMATH NATIONAL FOREST, OREGON

Plot No. and Date Treated	Chemical Used and Concentration	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
6/3					
1	2,4-D 100% acid in Carbowax 1% 1.0 oz. acid in 10 gals. water + Tergitol #7 (1 tbsp.)	1	6	500	40
2		2	4	2000	100
3		3	7	1000	75
4		4	12	1500	100
6/17					
5	2,4-D 70% Dow Na salt 1.43 oz. salt in 10 gals. water + Tergitol #7 (1 tbsp.)	1	12	400	40
6		2	5 1/	60	30
7		3	8	1500	90
8		4	7	1200	90
7/19					
9	Ammate 2/ 6 lbs. in 6 gals. soln.	2	4	500	75
10		1	6	375	60
14		3	4	400	75
11	2,4-D 100% acid 1.0 oz. acid in 5 oz. triethanolamine in 6 gals. water + Tergitol #7 (1 tbsp.)	3	5	400	60
12		2	6	500	75
13		1	7	375	60

1/ This plot also had 4 R. binominatum with 700 F.L.S.

2/ Proprietary grade of ammonium sulfamate containing about 80% by weight of this chemical.

TABLE 11

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D ON RIBES SANGUINEUM[1/], DOE PEAK PLOTS, KLAMATH NATIONAL FOREST, OREGON

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes[2/]	F.L.S.	Percent Ground Occupied by Ribes
9/5					
1	2,4-D 100% acid + furfural (6 tbsp.)	1	2 San.	350	70
2		3	2 San. 1 Lac.	450 40	90 -
3	1.0 oz. acid in 6 gals. water	2	8 San. 1 Lob. 1 Lac.	- 75 20	50

[1/] Bushes in ripe fruit stage with most of the vegetative growth finished for the season. R. sanguineum infected - uredinia and telia plentiful.

[2/] San.= sanguineum, Lac.= lacustre, and Lob. = lobbii.

TABLE 12

1945 INDIVIDUAL BUSH TREATMENTS WITH 2,4-D AND AMMATE, KLAMATH NATIONAL FOREST, OREGON

Bush No.	Dosage of Chemical 1/	Ribes Data F.L.S.	Ribes Data Diam. Crown Inches	Ribes Data Diam. Spread Stems, Feet
Long John Ridge Plots 2/				
1	2 Qts./Cr	180	1	3
2	1 Do.	75	6	2
3	3 Do.	225	1	4
4	3 Do.	250	1	4
5	4 Do.	300	2	5
6	Spr. + 5s 5/	75	3	2
7	Do. 10s	250	1	3
8	Do. 6s	150	8	3
9	Do. 4s	50	3	2
10	Do. 4s	50	4	2
11	Do. 4s	25	3	1
12	Do. 10s	170	16	3
13	2 Qts./Cr	100	10	2
14	1 Do.	40	4	2
15	4 Do.	200	12	2
16	4 Do.	250	16	3

Bush Number	Dosage of Chemical 3/	Ribes Data F.L.S.	Ribes Data Diam. Crown Inches	Ribes Data Diam. Spread Stems Feet
Red Mt. Creek Plots 4/				
1 Lob.	2 Qts./Cr	150	3	3
2 Lob.	1 Do.	90	3	2
3 Lob.	4 Do.	400	10	3
4 San.	2 Do.	75	4	2
5 San.	1 Do.	30	2	1
6 San.	1 Do.	25	2	1
7 Lob.	Spr. + 5s 5/	75	2	2
8 Lob.	Do. 5s	75	2	2
9 Lob.	Do. 5s	75	2	2
10 San.	Do. 6s	80	4	2
11 San.	Do. 5s	60	2	2
12 San.	Do. 5s	40	2	2
13 San.	Do. 5s	60	3	2
14 San.	Do. 5s	50	3	2
15 Lob.	Do. 5s	30	2	1
16 San.	Do. 6s	75	3	2
17 Lob.	Do. 53s	250	18	4

1/ Bushes 1-5 treated July 19, crown drench only with Ammate solution (3 lbs. in 3 gals. water). Bushes 6-12 spray and crown drench and bushes 13-16 crown drench only treated July 19 with 2,4-D 100% acid and 1.0 oz. in 6 gals. water plus conc. NH_4OH sufficient to form salt + Tergitol (1 tsp.).

2/ All plants treated were R. cruentum.

3/ Bushes 1-6 crown drench only, and bushes 7-17 spray plus crown drench treated July 19 with 2,4-D 60% Dow Na salt 1.67 oz. salt in 6 gals. water plus Tergitol (1 tsp.).

4/ Treated bushes were R. lobbii (Lob.) and R. sanguineum (San.).

5/ Letter "s" after the numeral indicates 1 full pump stroke of trombone pump (26 pump strokes = 1/5 gallon).

TABLE 13

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D AND AMMATE, HERSHBERGER LOOKOUT PLOTS, ROGUE RIVER NATIONAL FOREST, OREGON

Plot No. and Date Treated	Chemical Used and Concentration	Ribes Species Treated	Per Milacre			
			Gals. of Soln.	No. of Bushes	Feet of Live Stem	Percent Ground Occupied by Ribes
7/17						
1	Ammate 1 lb. per gal. water	Binominatum	2	18	150	50
2	2,4-D (60%) 1.67 oz. in 6 gals. water	Do.	2	24	100	40
9	Ammate 1 lb. per gal. water	Do.	1	15	100	30
3	Ammate 1/2 lb. per gal. water	Erythrocarpum	1	22	75	25
4	Ammate 1 lb. per gal. water	Do.	1	60	75	60
5	Ammate 1 lb. per gal. water	Do.	2	55	70	50
6	2,4-D (60%) 1.11 oz. in 6 gals. water No spreader	Do.	1	30	45	25
7		Do.	2	40	30	35
8		Do.	3	30 1/	40	20
9/6						
10	2,4-D (100%) 1.0 oz. in 6 gals. water + furfural (6 tbsp.) No spreader	Erythrocarpum	1	45	75	70
11		Do.	2	30	60	60
12		Do.	3	30	65	55

1/ One R. viscosissimum bush with 20 FLS also treated on this plot.

2/ Ribes still in full leaf with occasional ripe fruit. Vegetative growth apparently ceased for the season. Soil moist for 1 1/2 inches. Rain the night prior to treatment of plots.

TABLE 14

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D AND AMMATE ON RIBES TULARENSE
BLACK OAK TRAIL PLOTS, SEQUOIA NATIONAL PARK, CALIF.

Plot No. and Date Treated	Chemical Used and Concentration	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
8/1					
1	2,4-D 60% Dow Na salt 1.67 oz. salt in 6 gals. water. No spreader added	1	20	70	25
2		2	20	60	25
3		3	40	150	80
8/1					
4	2,4-D 60% Dow Na salt + 2 oz. furfural 1.67 oz. salt in 6 gals. water + Tergitol 1 tsp.	1	30	90	60
5		2	40	125	75
6		3	30	100	70
8/1					
7	Ammate (80% ammonium sulfamate) 5 lbs. in 6 gals. water + Tergitol (1 tsp.)	3	25	80	50
8		2	25	100	65
9		1	20	70	40

TABLE 15

1945 SPRAY AND SOIL DRENCH TESTS WITH 2,4-D, STONY CREEK PLOTS - SEQUOIA[1] NATIONAL FOREST, CALIFORNIA

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. of Soln.	No. of Bushes	F.L.S.	Percent Ground Occupied by Ribes
Ribes cereum (spring and summer[2] series)					
5/25					
1	2,4-D 70% Na salt by mixture Na_2CO_3 1.43 oz. in 10 gals. water + Tergitol (1 tbsp.) (Effective conc. 2,4-D, 800 p.p.m. or 0.08%)	1	2	500	50
2		2	1	600	60
3		3	1	1200	100
4		4	1	1000	100
P/T[3]	2,4-D 60% Dow Na salt 1.67 oz. in 6 gals. water. No extra wetting agent	6	3	5000	100
8/2					
5	2,4-D in 1 lb. of Carbowax (furnished by Wash.) in 8 gals. water (Effective conc. of acid about 1000 p.p.m.)	1	1	500	60
7		3	2	600	85
6	2,4-D 100% acid + furfural 2 oz. 1 oz. acid in 8 gals. water + Tergitol (1 tsp.)	1	2	500	70
8		3	2	400	75

[1] Practical spray test on R. roezli May 25: 0.133% soln. 2,4-D. 70% (carbonate) + Tergitol 1 tbsp. about 25 principal root centers. Plot located on General Grant Hiway 3.7 miles from Kings Canyon-Sequoia Junction.

[2] The following bushes were staked and given crown drench only applying the formulae used on plots 5,7 and 6,8. Carbowax formula bushes A, C, G, I, J, K, and L. Furfural formula bushes B, D, E, F, and H. Four gals. used on each group of bushes.

[3] Three large bushes given light spray coverage estimated to be about 1 gal. per milacre rate. Large bush received 3 gals. soln. and 2 medium sized bushes 1 1/2 gals. each.

TABLE 16

RECOMMENDATIONS ON THE USE OF NEW HERBICIDES FOR PRACTICAL RIBES ERADICATION WORK IN THE PACIFIC COAST REGION[1]
(Summarizes best information available through the fall of 1945)

Common Name of Chemical	Grade or Type to be Purchased for Field Use	Ribes Species	Dosage Per Milacre[2]
Sulfamate[3]	du Pont's Ammate (contains 80% by weight of ammonium sulfamate plus inert materials)	R. lacustre (stream)	1.0 lb. Ammate
Do.	Do.	R. lacustre (upland)	1.5 lbs. Ammate
Do.	Do.	R. inerme	2.0 lbs. Ammate
Do.	Do.	R. bracteosum	3.0 lbs. Ammate
Do.	Do.	R. erythrocarpum	0.75 lb. Ammate
2,4-D[4]	Dow Endoweed (contains 60% by weight of the sodium salt of 2,4-D acid plus wetting agent plus inert materials)	R. roezli	1 gal. of soln. containing 0.08% (800 p.p.m) of 2,4-D acid. For the Endoweed this is 1 gal. of soln. from a batch made by dissolving 1.67 oz. of dry powder in 10 gals. water

[1] Instructions for practical work: Dissolve Ammate at rate of 1 lb. or Endoweed 0.167 oz. per gal. of water; apply as a combined aerial spray and soil drench, wetting all leaves and stems to the point of dripping and applying balance of dosage to crown centers. Tergitol or a similar spreader should be added to all sprays.

[2] This is the basic dosage that would be applied per unit of ground fully occupied by ribes and is considered to be the average dosage for the species. In actual practice the gallonage needed to provide adequate coverage of any species will vary according to the size and density of the stems and foliage. For example, some stands of R. lacustre can be adequately treated by 3/4 of a gal. per milacre, while others may take as much as 2 gals.

[3] Ammonium sulfamate (Ammate) also appears to be highly toxic to R. binominatum, R. lobbii, R. viscosissimum, and R. tularense, but recommendations on dosage must await plot check in early summer of 1946.

[4] 2,4-D also appears to be toxic to R. cereum, R. nevadense, R. cruentum, and R. sanguineum, but observations for the 1946 growing season will be needed to confirm its effectiveness on these species.

SECTION II. RIBES ECOLOGY IN THE SUGAR PINE TYPE

1. The Cow Creek 10-Acre Regeneration Plot.

See the 1944 annual report, pp. 109, 115.

Eradicated Subplots. Seventy-six gooseberry plants were found in 1945 on these 10 selected square-chain subplots which were eradicated in 1941. But only 9 of these ribes plants had 6 inches or more of live stem. The probable reasons for the increase of small seedling-origin bushes on these eradicated subplots are (1) a spotty decadense of the brush cover, especially of snowbrush (*Ceanothus cordulatus*), and a concurrent ground-surface disturbance by rodents and birds. A very low percentage of these ribes with less than 6 inches of live stem will survive, but apparently some parts of this plot are now more favorable ribes sites than they were a few years ago.

Uneradicated Subplots. Table 17 is a summary of data collected during the past several years from the 10 selected uneradicated square-chain subplots of this series. Small slow-growing ribes have recently increased in number on these control plots, as they have on the 10 eradicated plots described above. The footnote to table 17 reports the typical grouped occurrence of these "new" seedlings. Such groups of small repressed ribes are apparently due to ground-surface disturbance by rodents and by birds, especially by the fox sparrow and the green-tailed towhee, sufficient to cause germination of duff-and-soil-stored seeds, and to a deterioration in small areas of the vigor and competition of brush species, especially *Ceanothus cordulatus*, which sufficiently increases light, etc. to allow some seedling persistence and growth.

The large decrease of live stem on these plots from 1944 to 1945 was due to severe damage by mice to many of the larger gooseberry bushes during the winter of 1944-45. From all appearances the mice were exceedingly hungry. One to several mice appear to have overwintered under the snow in a sort of den near the crowns of large gooseberry bushes. Many twigs were completely consumed, many branches were rather completely de-barked, and many of the branches otherwise more or less intact were girdled near the crown. Some large gooseberry plants were practically reduced to crowns with an attached whitish skeleton of branches. The size, vigor, and fruitfulness of many of the larger *R. roezli* bushes were temporarily reduced. Vigorous current-season regrowth was apparent during the summer.

2. Occurrence of Current Season Seedlings.

See the 1944 annual report, pp. 109-110, 115.

Table 18 reports data collected in 1945 from plots of this series. It is apparent, as far as the occurrence of the gooseberry seedlings is concerned, either that the plots are "running down", or that 1945 was not a particularly favorable year for the occurrence of current-season seedlings.

3. Seedling Survival and Growth on Worked Areas.

See the 1944 annual report, pp. 110, 116.

Table 19 summarizes data collected in 1945 from this series of plots. Smaller numbers of seedlings were found on these plots in 1945 than in 1944. The 1944-45 mean percent of seedling survival, however, is very close to the 1943-44 percent survival.

4. The Cow Creek 1.6-Acre Plot.

See the 1944 annual report, pp. 110, 116.

This plot, established in 1930 by F. A. Patty, has been inspected annually by the writer since 1936. Data from this plot in recent annual reports have been reported in the section on Seedling Survival and Growth on Worked Areas. Table 20 summarizes all seedling data collected since 1937. It is believed that estimates of current-season seedlings for the several years are rather consistently low, and that survival of ribes from current-season seedlings to one-year-old plants has been appreciably lower than is indicated by the table.

5. Occurrence and Growth of Ribes on Burns.

See the 1944 annual report, pp. 110-111, 116-117.

The data collected in 1945 add little to the general picture of ribes ecology on burned areas that has been presented in previous reports. The 1945 data will be reported in detail at some later date.

6. Regeneration of Ribes on One-Acre Plots.

See the 1944 annual report, pp. 111, 118-119.

A summary and analysis of all data collected from the Signal Peak one-acre plot since the plot's initiation in 1937 was presented in Serial Report No. 124 of the Berkeley Office (dated April 20, 1945). A similar report on the Blue Canyon one-acre plot awaits completion.

Table 21 summarizes the ribes data collected in 1945 from the 8 one-acre plots of this series. All known ribes were removed from the Blue Canyon plot at the time of inspection in 1944. This year only 4 ribes, with a total linear stem of 2.5 feet, could be found.

The 1945 data from the Signal Peak plot are of some interest in light of last winter's prediction that data from the inspection of September 12, 1944 (late fall inspection, and first post-eradication inspection) were probably incomplete. This year's inspection revealed 119 ribes, of which 5 were fruiting.

All known ribes were removed from the Shaver Timber one-acre plot in 1945. Regrowth of ribes on this area will be of considerable interest, in view of the rather quiescent state of ribes in the mature timber following initial eradication in 1939, and a sudden "ballooning" of the ribes population following logging of the plot in 1941-42.

Table 22 summarizes data concerning sugar pine reproduction collected in 1945 from the several one-acre regeneration plots. Table 1 (p.95) of the annual report for 1943 presents similar data.

7. Conditions on Grazing Exclosure Plots.

See the 1944 annual report, pp. 112-113, 120-122.

In this year's annual report detailed data will be presented only for the Chowchilla Mt. exclosure.

Table 23 summarizes all data collected from the Chowchilla Mt. exclosure plot which concern the occurrence of surrent-season ribes seedlings. As far as the occurrence of current-season seedlings is concerned, it is apparent that conditions now are much more encouraging inside than outside of the fence. The low current-season seedling production in 1943 and 1944, and the complete lack of current-season seedling production in 1945 within the fence suggests an advantage to ribes eradication programs in the restriction or the prevention of grazing on areas of troublesome ribes regeneration.

Table 24 presents a somewhat different aspect of ribes ecology within exclosures in that growth and fruiting of established ribes appear to be favored by protection from the fence.

Table 25 summarizes all data concerning coniferous reproduction collected to date from the Chowchilla Mt. exclosure plots. There has been a small increase in sugar pine reproduction outside of the fence. Ponderosa pine appears to have increased neither inside nor outside of the fence, but there are no seed trees of this species in the immediate vicinity of the exclosure. White fir and incense cedar have shown great increases in reproduction, both inside and outside of the fence. At the present time the probability of a fully stocked pine stand on this area is a bit low.

Planting of Sugar Pine Seedlings. See the 1944 annual report, pp. 112-113, 123. In the spring of 1943, and again in 1944, a few current-season sugar pine seedlings, previously grown in the greenhouse at Berkeley, were transplanted to the Cow Creek and to the Chowchilla Mt. exclosure plots. The seedling transplants of 1943 were watered at intervals during the first summer. The transplants of 1944 were settled with water when they were set in the field, but thereafter were not irrigated.

Table 26 summarizes the survival and growth during 1945 of the sugar pine seedling transplants. From the few available data it appears desirable to water such transplants during the first summer. At Cow Creek there appears to be a distinct advantage to the transplants outside of the fence, in spite of some damage by cattle. The survival and growth of transplants on Chowchilla Mt. have been appreciably better than at Cow Creek. Reasons for this advantage are not apparent. In general, tin can "protectors" appear undesirable for small transplants.

8. Fruiting of Seedling-Origin Ribes.

See the 1944 annual report, pp. 113-114, 124.

Table 27 summarizes all data collected to date from plot G, a plot on Chowchilla Mt. with an area of about 1/40 acre, established in 1938 to study the production of fruiting bushes in a region of intense gooseberry regeneration. During the 8 years that the plot has been under observation, some 877 fruiting gooseberries have been removed from the 24 milacres. For several years after initiation of the plot the age of the removed ribes could be approximated rather accurately, but accurate approximation of bush age is no longer possible because of confusing unconformities in annual stem-growth increments.

Table 28 presents data collected in 1945 from the fruiting gooseberries on the burned portion of the Cow Creek 5.6-acre fenced plot. This small area of mature timber was burned in the fall of 1936, and many R. roezli seedlings appeared the following spring. Gooseberries first fruited on the burn in 1941, and although there have been generally increasing numbers of fruiting bushes since 1941, it is believed that few or no ribes seeds have been added to the soil on the area. Each fall rodents, mainly chipmunks, more or less completely consume the gooseberry crop on this burned area. A few seeds in the hulls of gooseberry fruits have been left on the ground about fruiting bushes, but it is believed that no whole fruits have escaped the chipmunks during the 6 years that fruits have been produced on this burned area.

TABLE 17

RIBES FOUND ON 10 SELECTED UNERADICATED SQUARE-CHAIN SUBPLOTS OF COW CREEK 10-ACRE PLOT

Items of Data		Dates of Inspection				
		June 3, 1941	June 25, 1942	July 5, 1943	July 1, 1944	June 29, 1945
Size distribution of known ribes bushes	0-1.9'	6	7	7	4	15*
	2-5.9'	13	17	8	11	26
	6-15.9'	26	32	28	28	41
	16-40'	37	28	38	39	31
	41-100'	12	12	17	16	9
	101-500'	11	12	10	11	7
	501'+	1	1	1	1	1
	Totals	106	109	109	110	130
No. non-fruiting bushes		37	37	57	42	75
No. of fruiting bushes		69	72	52	68	55
Percent of fruiting bushes		65%	66%	48%	62%	42%
Total estimated number fruits		-	8450	1530	2820	2145
Av. no. fruits per fruiting bush		-	117	29	26	39
Est. total live stem, feet		4682	4898	4690	5011	3464
Variation in total LS, feet		-	+216	-208	+321	-1547
Av. LS per bush, feet		44.2	44.9	43.0	45.6	26.6
Visually estimated vigor of live ribes	E	-	5	1	3	0
	G	8	23	12	20	8
	F	37	42	56	61	53
	P	59	31	34	18	43
	VP	2	8	6	8	26

*Also known on one area of subplot #78 are 11 current season seedlings, 25 seedlings of 1944 origin, 4 of 1943 origin, and 6 of 1942 origin. The largest of these seedlings had about 3 inches of live stem.

TABLE 18

OCCURRENCE OF RIBES SEEDLINGS ON MILACRE PLOTS, 1944-1945

Series of Milacre Plots and Location	Dates of Inspection 1944	Dates of Inspection 1945	No. of Milacres in Series	No. of Current Season Seedlings 1944	No. of Current Season Seedlings 1945	Ratio of 1945- to 1944-Origin Seedlings
1938 Chowchilla Mt., Sierra N.F.	6/14	6/12	10	157	81	0.52
1939 do.	6/14	6/12	5	100	59	0.59
Plot E do.	6/17	6/13	12	561	448	0.80
Plot F do.	6/17	6/13	12	205	142	0.69
Markwood Mdw., Sierra N.F.	8/3	5/23	10	16	18	1.12
Pine City Mt. do.	7/27	7/6	6	23	8	0.35
Cow Creek Campsite, Stanislaus N.F.	6/21	6/15	10	202	153	0.76
Totals	-	-	65	1264	909	-
Means	6/29	6/13	9.3	181	130	0.72

TABLE 19

OCCURRENCE OF RIBES SEEDLINGS AND ONE-YEAR SURVIVAL ON CERTAIN ECOLOGY PLOTS, 1944-1945

Area and Forest	Plot, or Sub-plot	Dates of Inspection 1944	Dates of Inspection 1945	Milacres of Area	Current Season Seedlings Found 1944	Current Season Seedlings Found 1945	Ratio of 1945- to 1944-Origin Seedlings	1944-Origin Seedlings Found in 1945	Percent Survival of 1944 Seedlings in 1945
Cow Creek Campsite, Stanislaus N.F.	A	6/22	6/26	30	70	10	0.14	30	43
	B	6/21	6/16	28	234	72	0.31	64	27
	C	6/22	6/26	21	201	73	0.36	42	21
	D	6/22	6/16	5	2	1	0.50	None	None
Chowchilla Mt. Sierra N.F.	E	6/17	6/13	12	561	448	0.80	31	6
	F	6/17	6/13	12	205	142	0.69	32	16
Cow Creek 1.6-acre plot, Stanislaus N.F.	I	7/4	6/27	60	65	25	0.38	24	37
	II	7/4	6/27	210	400	320	0.80	240	60
	III	7/5	6/27	300	390	340	0.87	344	88
	IV	7/5	6/28	200	135	100	0.74	83	61
	V	7/5	6/28	200	40	30	0.75	36	90
	Tot.*	7/5	6/27	970	1030	815	0.79	727	71
Butt Creek Campsite, Plumas N.F.	I	8/25	7/25	25	None	2	∞	None	None
	II	8/25	7/25	24	3	1	0.33	1	33
Totals and Means		7/7	6/27	1127	2306	1564	0.68	927	40

*This line of figures excluded from computations of totals and means.

TABLE 20

SUMMARY OF RIBES SEEDLING OCCURRENCE AND PERSISTENCE ON SUBPLOTS I-V (0.97 acre) OF COW CREEK 1.6-ACRE PLOT

Dates of Inspection	CSS Estimated and Left on Plot	Ribes removed from plot at time of inspection. Age of ribes in years as shown									Total Ribes Removed
		1	2	3	4	5	6	7	8	11	
6/20/37	7,015	5,261	629	103	21	4	-	1	-	-	6,019
6/15/38	6,150	4,100	277	39	7	2	1	-	-	-	4,426
6/20/39	4,440	6,204	755	78	18	3	1	-	-	1*	7,060
6/25/40	1,690	1,491	398	77	15	3	1	1	-	-	1,986
6/23/41	1,165	308	147	61	8	1	1	-	-	-	526
7/1/42	3,470	777	94	46	13	4	-	-	-	-	934
6/29/43	1,100	1,010	131	39	22	4	2	1	-	-	1,209
7/4/44	1,030	485	103	27	4	5	2	1	-	-	627
6/28/45	815	727	143	69	10	-	1	1	1	-	952
Totals	26,875	20,363	2,677	539	118	26	9	5	1	1	23,739
Means	2,986	2,263	297	60	13	3	1	1	-	-	2,638

*This small repressed bush was 11 years old when removed; it was not fruiting, and had never fruited.

TABLE 21

SUMMARY OF RIBES DATA FROM ONE-ACRE REGENERATION PLOTS, 1945

Name of Plot	Dates of Check, 1945	Year of Last Ribes Erad.	Total Linear Feet of Estimated Live Stem (a)			Size Distribution of Ribes Plants, Live Stem Classes							Total Ribes Bushes	Fruiting Bushes	Species Distribution of Ribes		
			CSS	OLS	TLS	0-4"	5"-11"	1'-2.9'	5.9'	11.9'	12'-24'	25' plus			Ribes roez.	Ribes nev.	Ribes vis.
Shaver Timber	8/20	1939	(b)	(b)	5,710	367	143	193	99	59	43	61	965	45	861	18	86
Blue Canyon (c)	8/22	1944	1	2	3	2	2	-	-	-	-	-	4	-	4	-	-
Pilot Peak	7/5	1940	115	239	354	7	27	40	26	6	7	-	113	3	113	-	-
Signal Peak	7/4	1944	99	203	302	12	27	51	12	13	4	-	119	5	119	-	-
Inter-Road	7/13	1943	38	106	144	7	7	9	7	5	1	1	37	2	35	2	-
Gentle Gully (d)	7/19	1943	350	581	931	1	46	98	54	31	9	3	242	8	128	114	-
Rock Creek	7/20	1940	39	77	116	39	17	17	6	2	2	-	83	-	18	65	-
Fanianni Area	7/23	1940	75	67	142	140	29	19	2	-	4	-	194	2	194	-	-
Means	7/24	1942	604	359	963	72	37	53	26	15	9	8	220	8	184	25	11

(a) CSS = current season stem, OLS = older live stem, and TLS = total live stem.
(b) These data not collected. Estimated to be 4,110 and 1,600 in computation of the means.
(c) First post-eradication inspection.
(d) Sixty-six additional CSS, and 65 additional older ribes of small size also known on this plot.

TABLE 22

SUGAR PINE REPRODUCTION ON ONE-ACRE REGENERATION PLOTS, 1945

Name of Plot	Dates of Check, 1945	Height Classes of Sugar Pine Reproduction										Total Reproduction
		*CSS	0-5.9"	6-11.9"	1'-1.9'	2'-3.9'	4'-6.9'	7'-10.9'	11'-20'	21'-40'	41' plus	
Shaver Timber	8/20	-	1	5	9	18	24	13	17	9	2	98
Blue Canyon	8/22	1	5	10	3	4	6	16	20	46	67	178
Pilot Peak	7/5	-	-	10	13	31	39	32	23	-	4	152
Signal Peak	7/4	-	1	2	10	41	38	18	22	-	-	132
Inter-Road	7/18	-	-	9	21	53	65	74	73	21	12	328
Gentle Gully	7/19	-	-	6	4	20	13	20	19	1	-	83
Rock Creek	7/20	-	4	10	4	11	3	1	1	1	2	37
Fanianni Area	7/23	-	2	8	7	10	5	1	1	1	2	37
Means	7/24	0	2	8	9	23	24	22	22	10	11	131

*CSS = current season seedlings.

TABLE 23

A COMPARISON OF THE OCCURRENCE OF CURRENT-SEASON RIBES SEEDLINGS INSIDE AND OUTSIDE OF FENCE, CHOWCHILLA MT. EXCLOSURE PLOT

Dates of Inspection	Subplots Outside of Fence				Subplots Inside of Fence				Total Outside of Fence	Total Inside Fence	Plot Grand Total
	Hand Eradication		Oil Eradication		Hand Eradication		Oil Eradication				
	1	3	2	4	6	7	5	8			
6/25/41	512	475	587	283	655	337	460	481	1,857	1,933	3,790
7/7/42	105	233	391	133	328	217	168	143	862	856	1,718
6/15/43	45	18	26	8	2	3	2	12	97	19	116
6/13/44	95	75	75	85	5	5	10	5	330	25	355
7/3/45	30	24	60	25	-	-	-	-	139	-	139
Totals	787	825	1,139	534	990	562	640	641	3,285	2,833	6,118

TABLE 24

COMPARISON OF THE PERSISTENCE AND GROWTH OF RIBES INSIDE AND OUTSIDE OF FENCE, CHOWCHILLA MT. EXCLOSURE PLOT

Items of Data		1941-Origin Ribes					1942-Origin Ribes				1943-Origin			1944-Origin		1945
		8/18 1941	9/15 1942	9/13 1943	9/13 1944	9/25 1945	9/15 1942	9/13 1943	9/13 1944	9/25 1945	9/13 1943	9/13 1944	9/25 1945	9/13 1944	9/25 1945	9/25 1945
RIBES GROWING OUTSIDE OF FENCE																
Size classes of ribes bushes	0-0.9"	341	1	1	-	-	168	4	-	-	21	-	1	50	4	15
	1-1.9"	63	19	7	2	1	74	17	3	4	7	1	1	12	13	7
	2-3.9"	3	28	16	9	10	32	26	20	9	1	11	5	2	15	2
	4-5.9"	1	22	12	12	3	9	19	26	7	1	4	1	1	2	-
	6-8.9"	-	12	19	12	7	-	10	24	10	-	1	4	-	2	-
	9-11.9"	-	12	11	11	4	-	5	12	13	-	2	1	-	1	-
	1-2.9'	-	15	37	32	25	-	7	27	41	-	2	5	-	2	-
	3-5.9'	-	3	8	18	29	-	-	5	12	-	1	1	-	-	-
	6-11.9'	-	-	3	12	16	-	-	1	3	-	-	-	-	-	-
	12-24.9'	-	-	3	4	12	-	-	-	4	-	-	-	-	-	-
	25'+	-	-	-	5	9	-	-	-	-	-	-	-	-	-	-
Total live ribes		408	112	117	117	116	283	88	118	103	30	22	19	65	39	24
Total LS*, feet		16	73	207	499	881	28	38	105	204	3	12	17	4	11	2
Mean LS, inches		0.5	7.9	21.2	51.2	91.1	1.2	5.2	10.7	23.8	1.3	6.4	11.0	0.7	3.4	1.0
Fruiting bushes		-	-	-	7	16	-	-	-	-	-	-	-	-	-	-
RIBES GROWING INSIDE OF FENCE																
Size classes of ribes bushes	0-0.9"	569	19	6	-	4	62	11	-	1	10	-	1	-	-	1
	1-1.9"	65	48	17	11	11	22	8	4	8	4	1	3	-	-	-
	2-3.9"	4	52	21	21	23	7	5	8	4	-	1	-	-	-	-
	4-5.9"	-	33	20	16	10	2	1	3	4	-	-	1	-	-	-
	6-8.9"	-	16	20	8	12	1	2	3	2	-	1	-	-	-	-
	9-11.9"	-	4	24	12	8	-	2	1	1	-	-	-	-	-	-
	1-2.9'	-	15	22	39	32	-	3	4	2	-	-	1	-	-	-
	3-5.9'	-	10	17	21	23	-	1	-	1	-	-	-	-	-	-
	6-11.9'	-	-	15	23	18	-	-	2	-	-	-	-	-	-	-
	12-24.9'	-	-	9	11	24	-	-	-	2	-	-	-	-	-	-
	25'+	-	-	1	5	5	-	-	-	-	-	-	-	-	-	-
Total live ribes		638	197	172	167	170	94	33	25	25	14	3	6	-	-	1
Total LS*, feet		23	112	464	738	931	9	15	31	40	1	1	2	-	-	-
Mean LS,* inches		0.4	6.8	32.3	53.1	65.7	1.1	5.6	15.0	19.0	0.8	3.3	4.6	-	-	0.5
Fruiting bushes		-	-	-	16	24	-	-	-	-	-	-	-	-	-	-

*LS = linear live stem.

TABLE 25

A COMPARISON OF CONIFEROUS REPRODUCTION INSIDE AND OUTSIDE OF FENCE, CHOWCHILLA MT. EXCLOSURE PLOT

Kind of Tree	Relation to Fence	Year of** Check	Height Classes of Coniferous Reproduction									Totals
			CSS*	0-5.9"	6"-11.9"	1'-1.9'	2'-3.9'	4'-6.9'	7'-10.9'	11'-20'	21'-40'	
Sugar Pine	Outside	1940	-	1	4	-	-	-	-	5	-	10
		1942	-	2	3	2	-	-	-	5	-	12
		1943	-	1	2	4	-	-	-	5	-	12
		1945	-	3	1	2	3	-	-	3	2	14
	Inside	1940	-	10	3	-	-	-	-	-	-	13
		1942	-	11	2	1	-	-	-	-	-	14
		1943	-	3	8	1	1	-	-	-	-	13
		1945	-	-	10	2	-	1	-	-	-	13
Ponderosa Pine	Outside	1940	-	-	2	-	1	-	-	-	-	3
		1942	-	-	2	-	1	-	-	-	-	3
		1943	-	-	-	2	-	1	-	-	-	3
		1945	-	-	-	-	2	1	-	-	-	3
	Inside	1940	-	1	8	4	1	-	-	1	-	15
		1942	-	-	5	8	2	1	-	1	-	15
		1943	-	1	1	7	5	3	-	1	-	18
		1945	-	-	-	3	3	6	1	-	1	14
White Fir	Outside	1940	-	-	-	-	-	-	-	-	-	None
		1942	1	7	-	-	-	-	-	-	-	8
		1943	-	12	1	-	-	-	-	-	-	13
		1945	-	17	3	-	-	-	-	-	-	20
	Inside	1940	-	-	1	-	1	-	-	-	-	2
		1942	7	4	-	-	-	1	-	-	-	12
		1943	-	10	1	-	-	-	2	-	-	13
		1945	-	24	3	-	-	-	1	1	-	29
Incense Cedar	Outside	1940	-	1	1	3	-	-	-	-	-	5
		1942	1	6	6	2	-	-	-	-	-	15
		1943	-	11	9	3	-	-	-	-	-	23
		1945	-	27	14	4	1	-	-	-	-	46
	Inside	1940	-	7	8	7	1	1	-	-	-	24
		1942	18	6	9	8	9	1	-	-	-	51
		1943	-	13	8	8	11	1	-	-	-	41
		1945	-	53	13	8	10	6	-	-	-	90

*CSS = current season seedlings.
**Dates as follows: 9/13/40, 9/15/42, 9/13/43, and 7/3/45.

TABLE 26

SURVIVAL OF SUGAR-PINE CURRENT- SEASON SEEDLINGS PLANTED ON EXCLOSURE PLOTS

Exclosure Plot	Relation to Fence	Year of Planting	Type of Shade, or Other Protection	Total Seedlings Planted	Vigor of Live Sugar Pine Seedlings: Vigor (a) in Spring 1945 (b)						Size in Fall of 1945 (b). Inches of Seedling Height						
					VP	P	F	G	E	T	1-1.9"	2-2.9"	3-3.9"	4-4.9"	5-5.9"	6-6.9"	T
Cow Creek, Stanislaus N.F.	Inside of Fence	1943	Lath trough	6	-	-	2	1	-	3	-	-	2	-	1	-	3
			Small tin can	6	-	-	2	2	-	4	-	1	2	-	1	-	4
			N side of log	6	-	-	2	-	-	2	-	-	2	-	-	-	2
		1944	Pot stake only	10	1	1	2	-	-	4	2	1	1	-	-	-	4
			Small tin can	10	1	2	-	-	-	3	-	2	-	-	-	-	2
			#2 1/2 tin can (c)	10	1	1	2	-	-	4	-	2	1	-	-	-	3
			Lath trough	10	-	1	1	1	-	3	1	1	1	-	-	-	3
	Outside	1944	Lath trough	10	-	1	3	6	-	10	-	4	3	1	1	-	9
Chowchilla Mt. Sierra N.F.	Inside of Fence	1943	1x2" stake	12	-	-	7	4	-	11	-	1	4	2	1	1	9
			Stake and can	6	-	-	2	3	1	6	-	-	1	4	-	1	6
		1944	Lath trough	20	2	-	5	10	-	17	1	4	7	1	1	-	14
Totals				106	5	6	28	27	1	67	4	16	24	8	5	2	59

(a) Vigor ratings as follows: VP = very poor, P = poor, F = fair, G = good, and E = excellent. T = total live seedlings.

(b) Dates of inspection: Cow Creek 6/15/45 and 9/13/45. Chowchilla Mt. 6/12/45 and 9/25/45.

(c) Some with a 1x2" stake to shade them.

TABLE 27

SUMMARY OF FLOWERING OR FRUITING GOOSEBERRIES REMOVED FROM PLOT G (24 MILACRES) CHOWCHILLA MT.

Items of Data		Dates of Inspection of Plot								Totals and Means
		7/26 1938	6/24 1939	5/21 1940	6/27 1941	7/9 1942	6/16 1943	6/17 1944	6/13 1945	
Estimated age of removed ribes, years	U*	-	-	**	-	-	-	126	11	137
	9	-	-	**	-	-	-	2	-	2
	8	-	-	**	-	-	2	12	2	16
	7	-	-	**	-	-	67	13	-	80
	6	-	1	**	19	6	47	10	-	83
	5	1	4	**	84	30	18	1	-	138
	4	2	19	**	114	7	2	-	-	144
	3	-	64	**	5	-	-	-	-	69
	2	7	2	**	-	-	-	-	-	9
	Totals	10	90	**	222	43	136	164	13	678
Size Distribution of removed ribes	0-1.9'	-	-	1	-	-	-	-	-	1
	2-5.9'	-	5	49	52	-	29	71	3	209
	6-15.9'	3	48	115	155	23	75	83	10	512
	16-40'	5	31	33	15	20	32	10	-	146
	41-100'	1	6	1	-	-	-	-	-	8
	101-500'	1	-	-	-	-	-	-	-	1
	Totals	10	90	199	222	43	136	164	13	877
Fruits per bush of removed ribes	1-3	**	32	43	118	20	41	55	2	311
	4-10	**	20	33	62	19	45	20	5	204
	11-25	**	19	42	33	3	27	49	4	177
	26-50	**	8	40	8	1	14	23	1	95
	51-125	**	8	31	1	-	8	16	1	65
	126-250	**	2	8	-	-	1	-	-	11
	250+	**	1	2	-	-	-	1	-	4
	Totals	**	90	199	222	43	136	164	13	867
Est. TLS removed, feet		308	1,655	2,107	1,940	643	1,523	1,189	105	9,470
Mean size ribes, TLS		30.8	18.4	10.6	8.7	15.0	11.2	7.3	8.1	10.8
Est. total fruits removed		**	2,103	7,029	1,516	211	2,115	3,585	221	16,780
Mean fruits per ribes		**	23.4	35.3	6.8	4.9	15.6	21.9	17.0	19.4

*U = unclassified as to age because of unconformities in annual stem-growth increments.

**These data not recorded.

TABLE 28

FRUITING RIBES OBSERVED ON BURNED PORTION OF COW CREEK 5.6-ACRE PLOT, 1945

Dates of Inspection	Number of fruiting bushes, by live stem classes, as shown							Total Fruiting Bushes	Total Estimated Fruits	Mean Fruits Per Bush	Mean Estimated LS
	1'-2.9'	3'-5.9'	6'-11.9'	12'-24.9'	25'-39'	40'-59'	60' plus				
6/18	2	11	19	31	13	4	1	81	2,102	26.0	16.8
6/30	1	10	19	31	13	4	1	79	1,758	22.3	17.2
7/27	1	10	18	30	13	4	1	77	1,452	18.9	17.2
8/27	-	-	4	3	2	1	-	10	12	1.2	18.1

SECTION III. LABORATORY, GREENHOUSE, AND SPECIAL ACTIVITIES

Laboratory, greenhouse, and special activities at Berkeley, Calif., at Spokane, Wash., and at Moscow, Ida. were in progress during the spring and early winter of 1945. All regular methods personnel were engaged in these activities. C. R. Stillinger was assisted in compilation and analysis of disease study work by a part-time employee, Mrs. Evelyn J. Daubenmire.

Principal laboratory and greenhouse activities related to the testing of the growth regulating chemicals now being used as weedkillers. Tests of 2,4-dichlorophenoxyacetic acid (hereafter called 2,4-D) and its water soluble analogs were made on duckweed, barley, and ribes in a series of tests designed to devise the most suitable formulae for field use. A concentration of 800 p.p.m. of 2,4-D (either as a sodium or ammonium salt; in mixture with Carbowax in acid, neutral or alkaline medium; as an acid, alkaline or neutral soap of triethanolamine; or as a sodium salt in mixture with excess sodium carbonate) proved to be fully effective on Ribes roezli under greenhouse conditions. The field tests based on the results of this preliminary laboratory and greenhouse work are given under Field Work in this report.

Rapid microchemical methods were tested and used to analyze a large number of sugar-pine-type soils (Sierra Nevada) for the principal nutrient constituents of nitrogen, potassium, calcium, phosphorus, magnesium, manganese, etc., to establish correlations between R. roezli sites and chemical properties of the soil. The best correlation between sites of high ribes regeneration and the nutrient constituents of the soil was furnished by nitrate and ammonia nitrogen. Also some correlation was noted between nitrogen content of the soil and the record of fires over the area from which the soil sample had been collected.

Further tests of methods previously devised for extracting ribes seeds from duff and soil samples were made by processing soils from the Northwestern, Southern Appalachian, and Pacific Coast Regions.

Studies on the longevity and germinative reactions of ribes and pine seeds were continued, as were special activities in the design of methods for the statistical analysis of data on pine disease and blister rust damage and control requirements relative to age classes in the management of western white pine. A summary report was prepared to describe and illustrate all special ribes eradication equipment devised during the past 20 years; H. Miller Cowling prepared considerable photographic material for this report.

In completing the above work, the following special reports were prepared and made available to blister rust personnel of the Northwestern and Pacific Coast Regions during the calendar year of 1945.

BLISTER RUST DAMAGE AND CONTROL REQUIREMENTS RELATIVE TO AGE CLASSES IN THE MANAGEMENT OF WESTERN WHITE PINE. (Preliminary report to the Spokane office)
.....Virgil D. Moss

Bureau Ms. 7847. POISON OAK (RHUS DIVERSILOBA) AND ITS CONTROL BY MECHANICAL AND CHEMICAL MEANS.
.....H. J. Hartman and H. R. Offord

FIELD EQUIPMENT DEVELOPED SPECIALLY FOR THE ERADICATION OF RIBES IN THE NORTHWESTERN AND PACIFIC COAST REGIONS.
.....H. R. Offord,
J. F. Breakey, and
L. P. Winslow

Serial No. 123 - SURVIVAL IN THE GREENHOUSE OF SMALL RIBES ROEZLI SEEDLINGS FOLLOWING REMOVAL OF AERIAL PARTS.
.....L. P. Winslow

Serial No. 124 - AN ECOLOGIC HISTORY OF A RIBES POPULATION ON AN UPLAND PLOT IN THE CENTRAL SIERRA NEVADA IN RELATION TO RIBES ERADICATION WORK.
.....C. R. Quick

Serial No. 125 - EXPERIMENTAL GERMINATION OF RIBES AND PINE SEEDS. SERIES OF 1944.
.....C. R. Quick

Serial No. 126 - WHAT AN ECOLOGIST SHOULD LIKE TO KNOW ABOUT AN HERBARIUM SPECIMEN.
.....C. R. Quick

Serial No. 127 - MICROCHEMICAL SOIL TESTS ON SOIL SAMPLES COLLECTED IN THE SUGAR PINE FORESTS OF THE SIERRA NEVADA MOUNTAINS.
.....L. P. Winslow

Serial No. 128 - GROWTH IN THE GREENHOUSE OF RIBES, CEANOTHUS, AND SUGAR PINE SEEDLINGS.
.....C. R. Quick

Serial No. 129 - Bureau Ms. 7711. A RAPID METHOD FOR ESTIMATING THE PHYTOCIDAL ACTION OF CHEMICALS.
.....H. R. Offord

Serial No. 130 - GROWTH OF SUGAR PINE SAPLINGS ON CROCKER RIDGE IN AN AREA OF STAGNATED REPRODUCTION.
.....C. R. Quick